

ELECTRONIC BOOK WITH RESTRICTED ACCESS FEATURES

Related Applications

This application is a continuation-in-part of U.S. Application Serial No. 08/336,247 entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM, filed November 7, 1994, and U.S. Application Serial No. 08/160,194, entitled ADVANCED SET-TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS, filed December 2, 1993, and U.S. Application Serial No. 08/906,469, entitled REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed August 5, 1997 which is a continuation of U.S. Application Serial No. 08/160,281, entitled TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed December 2, 1993, which is now U.S. Patent No. 5,798,785, dated August 25, 1998, all of which are incorporated herein by reference.

This application is related to U.S. Application Serial No. 09/237,828, filed on January 27, 1999, entitled ELECTRONIC BOOK ELECTRONIC LINKS, U.S. Application Serial No. 09/289,957, filed on April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE DELIVERY SYSTEMS, and U.S. Application Serial No. 09/289,956, filed on April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE DELIVERY METHODS, all of which are incorporated herein by reference.

Technical Field

This invention is directed to an electronic book unit having one or more electronic books. More specifically, the invention relates to an apparatus and method for restricting access to electronic books.

Background Art

Sparked by the concept of an information superhighway, a revolution will take place in the distribution of books. Not since the introduction of Gutenberg's movable typeset printing has the world stood on the brink of such a revolution in the distribution of text material. The definition of the word "book" will change drastically in the near future. Due to reasons such as security, convenience, cost, and other technical problems,

1 book and magazine publishers are currently only able to distribute their products in paper
2 form. This invention solves the problems encountered by publishers.

3 Summary Of Invention

4 Methods and apparatus consistent with the present invention include features for
5 restricting access to electronic books displayed on a viewer. The methods and apparatus
6 include displaying an identification of an electronic book on a viewer, receiving
7 information for use in restricting access to the electronic book, and restricting access to
8 the electronic book based upon the information. The information may relate to access to
9 the electronic book and the content of the book. Alternatively, the information may
10 include identification of potential users of the electronic book, a rating assigned to the
11 electronic book, selected portions of the electronic book, a particular order in which
12 pages of the electronic book are to be viewed, a particular order in which sections of a
13 page of the electronic book are to be viewed, or a mode of the viewer.

14 Many uses of the restricted access features are possible. For example, a family
15 use electronic book may restrict children's access to particular content of an electronic
16 book. Instructors may also use restricted access features for teaching exercises for their
17 students. For example, they may require selection of pages or sections of pages in a
18 particular order to facilitate a teaching process. They may also restrict access to particular
19 content based upon, for example, an assigned order in which the students are to complete
20 particular assignments.

21 Brief Description Of Drawings

22 Figure 1 is a block diagram of the primary components of the electronic book
23 selection and delivery system.

24 Figure 2 is a schematic showing an overview of the electronic book selection and
25 delivery system.

26 Figure 3a is a schematic of the delivery plan for the electronic book selection and
27 delivery system.

28 Figure 3b is a schematic of an alternate delivery plan.

1 Figure 4 is a block diagram of an operations center.

2 Figure 5a is a flow diagram of the processing at the operations center and uplink.

3 Figure 5b is a block diagram of the hardware configuration for an uplink site.

4 Figure 6a is a block diagram of the hardware configuration for a four component
5 home subsystem.

6 Figure 6b is a schematic of a two unit home subsystem.

7 Figure 7 is a flow diagram of the processes performed by the video connector.

8 Figure 8 is a block diagram for an example of a library unit.

9 Figure 9 is a flow diagram of some of the processes performed by the library on
10 the received data stream.

11 Figure 10 is a flow diagram of the processes performed by the library unit on
12 information requests from the viewer.

13 Figure 11 is a block diagram showing the components for an example of a viewer.

14 Figure 12 is a flow diagram of some of the processes performed by the viewer on
15 an information request from a subscriber.

16 Figure 13 is a chart depicting the menu structure and sequencing of menus in the
17 menu system.

18 Figure 14a is a schematic of an introductory menu.

19 Figure 14b is a schematic showing an example of a main menu.

20 Figures 14c, 14d, 14e, 14f, 14g, 14h, 14i and 14j are schematics showing
21 examples of submenus.

22 Figure 15 is a schematic diagram of an electronic book system for a bookstore or
23 public library.

24 Figure 16a and Figure 16b are schematics of hardware modifications or upgrades
25 to a set top converter.

26 Figure 17 is a schematic showing a set top terminal that includes a data receiver
27 and data transmitter.

28 Figure 18a is a schematic of a book-on-demand system.

1 Figure 18b is a schematic of an operations center supporting a book-on-demand
2 system.

3 Figure 19 is a diagram of a main menu for restricted access features for electronic
4 books.

5 Figure 20 is a flow chart of a main menu process.

6 Figure 21 is a flow chart of a view book routine.

7 Figure 22 is a diagram of a user name screen.

8 Figure 23 is a diagram of a select book screen.

9 Figure 24 is a diagram of an access denied screen.

10 Figure 25 is a diagram of an electronic book cover page screen.

11 Figure 26 is a flow chart of a book ratings routine.

12 Figure 27 is a diagram of a user name and password screen.

13 Figure 28 is a diagram of a book ratings screen.

14 Figure 29 is a flow chart of an implement ratings process.

15 Figure 30a is a diagram of a page text screen.

16 Figure 30b is a diagram of a page screen with selected text.

17 Figure 30c is a diagram of a page screen with restricted text.

18 Figure 30d is a diagram of a page text and graphics screen.

19 Figure 30e is a diagram of a page screen with selected graphics.

20 Figure 30f is a diagram of a page screen with restricted graphics.

21 Figure 31 is a flow chart of an access levels routine.

22 Figure 32 is a diagram of an access levels and viewer mode screen.

23 Figure 33 is a flow chart of a page-based book view routine.

24 Figure 34 is a diagram of a page-based book view screen.

25 Figure 35 is a flow chart of a content-based book view routine.

26 Figure 36 is a diagram of a content-based book view screen.

27 Figure 37 is a flow chart of a time-based book view routine.

1 Detailed Description

2 An electronic book selection and delivery system is a new way to distribute
3 electronic books to bookstores, public libraries, schools and consumers. The
4 technological breakthroughs of this invention provide a secure system for both delivering
5 selected electronic books and receiving payments. The system has an unusual
6 combination of features that provides the consumer with an electronic book unit that has
7 a high tech aura while being very practical, portable, and easy to use.

8 The clear advantage of the system is that it eliminates the distribution of any
9 physical object such as a paper book or computer memory device from any book or text
10 distribution system. The purchase of an electronic book may become a PAY-PER-
11 READ™ event avoiding the overhead, "middle-men," printing costs, and time delay
12 associated with the current book distribution system. Published material and text such
13 as the President's speech, a new law, a court decision on abortion, or O.J. Simpson's
14 testimony can be made immediately available to the consumer at a nominal fee.

15 The system is a novel combination of new technology involving the television,
16 cable, telephone, and computer industries. It uses high bandwidth data transmissions,
17 strong security measures, sophisticated digital switching, high resolution visual displays,
18 novel controls, and user friendly interface software.

19 The primary components of the text delivery system are the subsystem for placing
20 the text onto a signal path and the subsystem for receiving and selecting text that was
21 placed on the signal path. A preferred embodiment of the system includes additional
22 components and optional features that enhance the system. The system may be
23 configured for use by bookstores, public libraries, schools and consumers.

24 The system for consumer use is made up of four subsystems, namely: (1) an
25 operations center, (2) a distribution system, (3) a home subsystem including reception,
26 selection, viewing, transacting and transmission capabilities, and (4) a billing and
27 collection system.

1 The operations center performs several primary functions: manipulating text data
2 (including receiving, formatting and storing of text data), security encoding of text,
3 cataloging of books, providing a messaging center capability, and performing uplink
4 functions. The system delivers the text from the operations center to consumer homes
5 by inserting text data into an appropriate signal path. The insertion of text is generally
6 performed with an encoder at an uplink site that is within or near the operations center.
7 If the signal path is a video signal path, the system can use several lines of the Vertical
8 Blanking Interval (VBI), all the lines of the analog video signal, a digital video signal or
9 unused portions of bandwidth to transmit text data. Using the VBI delivery method, the
10 top ten or twenty book titles may be transmitted with video during normal programming
11 utilizing existing cable, satellite, wireless or broadcast transmission capability without
12 disruption to the subscriber's video reception. Using the entire video signal, thousands
13 of books may be transmitted within just one hour of air time. Nearly any analog or digital
14 video distribution system may be used to deliver the video signal with included text.

15 The text data may also be transmitted over other low and high speed signal paths
16 including a telephone network (e.g., a public switched telephone network) having a high
17 speed connection such as an asynchronous digital subscriber line (ADSL) connection.
18 Alternatively, other delivery systems and methods may be used, such as those disclosed
19 in the related applications identified above.

20 The home subsystem performs four primary functions: connecting to the video
21 distribution system, selecting text, storing text, and transacting through a phone or cable
22 communicating mechanism. The components of the home subsystem may be configured
23 in a variety of hardware configurations. Each function may be performed by a separate
24 component, the components may be integrated, or the capability of existing cable set top
25 converter boxes, personal computers, and televisions may be utilized. Preferably, a
26 connector, library unit and an electronic book unit, or viewer unit, are used. The
27 connector portion of the home subsystem receives the analog video signal and strips or
28 extracts the text from the video. The home library stores the text signal, provides a user

1 friendly software interface to the system and processes the transactions at the consumer
2 home. The viewer provides a screen for viewing text or menus and novel user friendly
3 controls. The viewer may also incorporate all the functionality of the home subsystem.

4 The viewing device is preferably a portable book shaped viewer which stores one
5 or more electronic books for viewing and provides a screen for interacting with the home
6 library unit. A high resolution LCD display is used to both read the books and to interact
7 with the home library software. An optional phone connector or return-path cable
8 connection initiates the telephone calls and, with the aid of the library, transmits the
9 necessary data to complete the ordering and billing portion of the consumer transaction.
10 The user friendly controls include a bookmark, current book and page turn button. The
11 billing and collection system performs transaction management, authorizations,
12 collections and publisher payments automatically utilizing the telephone system.
13 Alternative ordering methods are disclosed in the related applications identified above.

14 In one embodiment, the primary components of the electronic book selection and
15 delivery system 200 are an encoder 204, a video distribution system 208, a connector 212,
16 and a text selector 216 as shown in Figure 1. The encoder 204 places textual data on a
17 video signal to form a composite video signal. Although the composite signal may
18 contain only textual data, it usually carries both video and textual data. A variety of
19 equipment and methods may be used to encode text data onto a video signal. The video
20 distribution system 208 distributes the composite video signal from the single point of
21 the encoder 204 to multiple locations which have connectors 212. The connector 212
22 receives the digital or analog video signal from the video distribution system 208 and
23 separates, strips or extracts the text data from the composite video signal. If necessary,
24 the extracted text data is converted into a digital bit stream. Text selector 216 works in
25 connection with the connector 212 to select text.

26 Using a connector 212 and text selector 216 combination, various methods of
27 selecting and retrieving desired text from a composite or video signal are possible. Text
28 may be preselected, selected as received or selected after being received and stored. A

1 preferred method is for the connector 212 to strip or extract all the text from the video
2 signal and have the text selector 216 screen all the text as received from the connector
3 212. The text selector 216 only stores text in long term or permanent memory if the text
4 passes a screening process described below.

5 An overview of the electronic book selection and delivery system 200 is shown
6 in Figure 2. The delivery system 200 includes: an operations center 250 including an
7 uplink site 254, a video distribution system 208, a home system 258 including a video
8 connector 212, a library 262, a viewer 266, and a phone connector 270, telephone system
9 274, an internet web site 279 and a billing and collection system 278. Also as shown in
10 Figure 2, the home system 258 may include connections to a television 259 and a
11 personal computer 261. The television 259 and the personal computer 261 may be used
12 to display menu screens, electronic books, electronic files, or any other information
13 associated with the delivery system 200. In addition, the television 259 and the personal
14 computer 261 may provide control function that replicate and supplement those of the
15 viewer 266.

16 The operations center 250 receives textual material from outside sources 282 such
17 as publishers, newspapers, and on-line services. Alternately, the outside sources may
18 maintain electronic books at the Internet web site 279. The outside sources 282 may
19 convert textual and graphical material to digital format, or may contract with another
20 vendor to provide this service. The operations center 250 may receive the textual and
21 graphical material in various digital formats and may convert the textual material to a
22 standard compressed format for storage. In so doing, the operations center 250 may
23 create a pool of textual material that is available to be delivered to the home system 258.
24 The textual material may be grouped by books or titles for easy access.

25 As used herein, "book" means textual or graphical information such as contained
26 in any novels, encyclopedias, articles, magazines or manuals. The term "title" may
27 represent the actual title assigned by an author to a book, or any other designation
28 indicating a particular group, portion, or category of textual information. The title may

1 refer to a series of related textual information, a grouping of textual information, or a
2 portion of textual data. For example, "Latest Harlequin Romance", "Four Child Reading
3 Books (Ages 10-12)", "Encyclopedia 'BRITANNICA'™", "President's Speech",
4 "Instruction Manual", "Schedule of 4th of July Events", "Pet Handbooks", "Roe v.
5 Wade", and "The Joy of Cooking" are suitable titles. Also, the title may be a graphical
6 symbol or icon. Thus, a picture of a wrench may be a title for a repair book, a picture of
7 a computer a title for a computer book, a graphical symbol of a telephone a title for a
8 telephone book, a drawing of a dagger a title for a mystery book, a picture of a bat and
9 ball a title for a sports book and a picture of tickertape a title for a business book. The
10 term "electronic book" refers to the electronic counterpart to a "book."

11 The operations center 250 includes an uplink site 254 for placing the text onto a
12 video signal and sending the composite video signal into a video distribution system. The
13 uplink site 254 would generally include an encoder 204 (not shown in Figure 2) to encode
14 the text onto a video signal.

15 Many analog and digital distribution systems 208, or other telecommunications
16 systems, can be used with the delivery system 200, such as a cable television distribution
17 system, a broadcast television distribution system, video distributed over telephone
18 systems, distribution from the Internet, direct satellite broadcast distribution systems, and
19 other wired and wireless distribution systems.

20 The home system 258 performs five primary functions: (1) connecting with a
21 video distribution system, (2) selecting data, (3) storing data, (4) displaying data, and (5)
22 handling transactions. An important optional function of the home sub-system 258 is
23 communicating using a telephone communication system 274. The home system 258 is
24 made up of primarily four parts: a video connector 212 or similar type of connector for
25 connecting with the video distribution system 208, a library unit 262 for storing and
26 processing, an electronic book, or viewer unit, 266 for viewing menus and text and a
27 telephone connector 270 for connecting with a telephone communications system 274.

1 In an alternate arrangement, the viewer 266 may include all the functionality of the home
2 system 258.

3 The billing and collection system 278 may be co-located with the operations
4 center 250 or located remote from the operations center 250. In one embodiment, the
5 billing and collection system 278 is in communication with the home system 258 via
6 telephone-type communication systems (for example 274). Any of a number of telephone
7 type communication systems, such as, a cellular system, will operate with the billing and
8 collection system 278. The billing and collection system 278 records the electronic books
9 or portions of text that are selected or ordered by the subscriber. The collection system
10 will charge a subscriber's credit account or bill the subscriber. In addition, the billing and
11 collection system 278 will monitor that amount due to publishers or other outside sources
12 282 who have provided textual data or other services such as air time to enable the text
13 delivery system 200 to operate.

14 When electronic books are provided via the Internet web site 279, the billing and
15 collecting functions may be incorporated into the Internet web site 279. For example, a
16 subscriber may pay for an electronic book selection by entering a credit card number into
17 a data field of a page of the Internet web site 279. In this configuration, a separate billing
18 and collection system may not be required.

19 Figure 3a is an expanded overview of a delivery plan 301 for the delivery system
20 200. The delivery plan 301 supports various types of subscribers and various billing
21 systems. Figure 3a shows that publishers 282 will provide text transfer 302 to the
22 operations center 250' and receive payments 306 from the billing and collection system
23 278'. A separate channel uplink site 254' is shown in this configuration receiving data
24 310 from the operations center 250'. The operations center 250' has three separate
25 sections (318, 322, 326) one for text receiving, formatting and re-entry 318, a second for
26 security encoding 322 and a third section for catalog and messaging center functions 326.

27 The billing and collection system 278' shown has two sections (330, 334) one for
28 transaction management, authorizations and publisher payments 330, and the other for

1 customer service 334. The customer service section 334 provides for data entry and
2 access to customer account information. Transaction accounting information 338 is
3 supplied to credit card companies 342 by the transaction management section 330 of the
4 billing and collection system 278'. The credit card companies 342 provide billing 346 to
5 customers either electronically or by mail.

6 Three methods or examples for communicating between the subscriber base 348
7 and the billing and collection system 278' are shown: by telephone switching 350 alone,
8 cellular (PCS) switching 354 and telephone switching 350 combined, and by use of the
9 cable system 358 and the telephone switching 350. The system shown supports both one-
10 way 362 and two-way cable communication 366 with subscribers. Public libraries and
11 schools 370 as well as bookstores 374 may use the delivery system 301.

12 Public libraries and schools 370 would have a modified system to allow the
13 viewer 266 to be checked-out or borrowed while bookstores 374 would rent or sell the
14 viewer 266 and sell the electronic books. The bookstores 374 as well as the public
15 libraries and schools 370 may be serviced by cable 378. Optional direct broadcast
16 systems (DBS) 382 can also be used with the delivery system 200. The DBS 382 may
17 provide the electronic books using digital satellite technology, with the electronic books
18 being received via a backyard satellite antenna, for example.

19 Figure 3b is an alternate delivery plan 301' that provides for electronic book
20 selection and delivery using the Internet. In Figure 3b, the publishers 282 provide the
21 electronic books to be posted at the Internet web site 279. The publishers may convert
22 the text and graphical data to digital format, compress the digital data, and upload the
23 compressed digital data to the Internet web site 279. Alternately, the publishers 282 may
24 arrange for an outside conversion activity 283 to convert the text and graphical data to
25 digital format. The conversion activity 283 may then provide the digital data to the
26 Internet web site 279. For example, a large on-line bookstore could gather publications
27 in electronic form from a variety of publishers, or could convert hard-copy books to

1 electronic form, and post the electronic books on the Internet such as at the Internet web
2 site 279.

3 The electronic books may then be transferred via a public switched telephone
4 network (PSTN), for example, direct to a subscriber 285, a library 286 and a bookstore
5 287. The library 286 and the bookstore 287 may also provide electronic books to the
6 subscriber 285.

7 I. The Operations Center

8 Figure 4 is a schematic of an operations center 250 which includes an uplink 254.
9 The operations center 250 gathers text or books by receiving, formatting, storing, and
10 encoding. A data stream 302 containing text is received at the operations center 250 by
11 a data receiver 402. The data receiver 402 is under the control of a processor 404. After
12 reception, the data stream is formatted using digital logic for formatting 406 which is also
13 under the control of the processor 404. If any additional text is being generated at the
14 operation center 250 locally for insertion into the distributed signal, the text generation
15 is handled through text generator hardware 410 which may include a data receiver and
16 a keyboard (not shown). Following processing by the text generator 410, the additional
17 text can be added to the text received by the combining hardware 414 that includes digital
18 logic circuitry (not shown).

19 The processing at the operations center 250 is controlled by a processor 404
20 which uses an instruction memory 416. The processor 404 and instruction memory 416
21 may be supplied by a personal computer or mini-computer. To perform the catalog and
22 messaging functions, the operations center 250 uses a catalog and message memory 420
23 and the text generator 410 if necessary.

24 The data stream of text, catalog and messages is preferably encoded by security
25 module encoding 424 prior to being sent to the uplink module 254. Various encoding
26 techniques may be used by the security encoding module 424 such as the commercial
27 derivative of NSA's encryption algorithm (Data Encryption System (DES)) and General
28 Instrument's DigiCipher II. Following encoding, the encoded text may be stored in text

1 memory 428 prior to being sent to the uplink 254. A first-in-first-out text memory
2 arrangement may be used under the control of the processor 404. Various types of
3 memory may be used for the text memory 428 including RAM. The operations center
4 250 may use file server technology for the text memory 428 to catalog and spool
5 electronic books for transmission as is described below.

6 To transmit textual data (i.e., electronic books), the delivery system 208 uses high
7 bandwidth transmission techniques such as those defined by the North American
8 Broadcast Teletext Standard (NABTS) and the World System Teletext (WST) standard.
9 Using the WST format (where each line of the Vertical Blanking Interval contains 266
10 data bits), a four hundred page book, for example, may be transmitted during
11 programming using four lines of the Vertical Blanking Interval at a rate of approximately
12 one book every 1.6 minutes (63,840 bits per second). Alternatively, electronic books may
13 be transmitted over a dedicated channel, which interrupts programming so that 246 lines
14 of video can be used to transmit approximately 2,250 books every hour (3.9 Mbits per
15 second). A teletext type format is the simplest but possibly the slowest text format to use
16 with the delivery system 200. In either event, an encoder 204 is utilized at an uplink site
17 254 to insert textual data into the analog video signal. In many other respects, the
18 delivery of the textual information is completed using existing cable television plant and
19 equipment.

20 Figure 5a is a flowchart of the steps involved in processing text from the publisher
21 or provider 282 that occurs at the operations center 250. As shown in block 500, the
22 publisher 282 processes data files of text for books, compresses, encrypts and sends the
23 data files to the operations center 250 or uplink 254. Text files for books are preferably
24 sent one book at a time. As shown in block 504, the uplink 254 or operations center 250
25 receives and processes the data stream from the publisher 282. Generally, part of this
26 processing includes encryption and error correction.

27 As shown in block 508, files are broken into smaller packets of information.
28 Header information is added to the packets. The bit stream is converted from a serial

1 digital bit stream to an analog bit stream that is compatible with an NTSC video signal.
2 Block 512 shows the switching of analog data into the video lines of a video signal. The
3 analog data is generally placed either in the VBI or the active video lines. In some
4 instances, it may be preferable to utilize unused portions of bandwidth (such as 5-40
5 MHZ, 70-75 MHZ, 100-109 MHZ or other guard bands) instead of the video lines.

6 Figure 5b is an example of a hardware configuration to perform some of the
7 functions for blocks 508 and 512. A video feed 516 is received and processed through
8 a sync stripper 520. The stripped sync signal 532 is used by the digital logic control 524.
9 The digital logic control 524 receives the sync signal 532 and a serial digital bit stream
10 528 for processing. The digital logic control 524 passes the serial digital bit stream to the
11 Digital to Analog converter 536 and outputs a control signal 540 for the video switch
12 544. The video switch 544 integrates the video feed 516 and analog data stream 548 into
13 a video feed with analog data signal inserted 552.

14 As an alternative to cable, satellite, broadcast, or other television delivery
15 methods, the public telephone system may be used to transmit books to the subscribers.
16 An average electronic book would take about 7 minutes to transmit over the public
17 telephone system. Using the telephone system, it is not necessary to combine video and
18 text into a composite signal. In most other respects, the operation center would remain
19 similar whether text delivery was by telephone or cable. File server technology (such as
20 that described in U.S. Patent No. 5,262,875, entitled AUDIO/VIDEO FILE SERVER
21 INCLUDING DECOMPRESSION/PLAYBACK MEANS, issued to Mincer, et al., and,
22 U.S. Patent No. 5,218,695, entitled FILE SERVER SYSTEM HAVING HIGH-SPEED
23 WRITE EXECUTION, issued to Noveck, et al., incorporated herein by reference) may
24 be used at the operation center with a telephone system text delivery method.

25 As another alternative to cable, television, and telephone system delivery, the
26 public telephone system may be used to provide access to the Internet, where an Internet
27 web site 279 may be accessed. Electronic books may be ordered, paid for, and delivered
28 directly from the Internet web site 279 over the telephone system.

1 In any delivery system using the telephone system, individual subscribers may
2 increase the electronic book deliver rate by incorporating high speed modems or other
3 communication devices such as an Integrated Services Digital Network (ISDN)
4 connector, or by use of an Asymmetric Digital Subscriber Line (ADSL)

5 II. The Home System

6 The hardware configuration for a four component home system 258 is shown in
7 Figure 6a. Figure 6b shows a hardware configuration for a two component home system.
8 The hardware components may also be incorporated into a single unit that communicates
9 with a terminal in a television delivery system or with a telephone system by use of a
10 modem, for example. The home system 258 performs several functions, such as
11 receiving data and video transmissions, stripping (or extracting) the data from the video
12 signal, screening and storing the data, providing user friendly interface controls and
13 software, displaying menus and text, processing transactions, initiating telephone calls
14 and transmitting billing data. Various hardware configurations may be utilized to achieve
15 the desired functions of the home system 258. For example, as shown in Figure 6b, the
16 home system 258 can be configured to utilize the reception and channel tuning capability
17 of the current installed subscriber base of cable converter boxes and televisions 601. The
18 home system 258 can also be designed as an advanced set top terminal converter box
19 with menu generation capability, electronic memory and a telephone modem as described
20 in section V below.

21 The electronic components which make up the home system 258 can be arranged
22 in a variety of ways. In the four unit system of Figure 6a the viewer 266 and library unit
23 262 are wired together while the remaining components communicate through RF
24 transceivers 604. In a simple version of the home system 258 there are only two units,
25 the library unit 262 and a viewer 266. Figure 6b shows a two unit home system 258 with
26 certain optional features. Finally, all the functionality of the home system 258 may be
27 incorporated into one electronic book unit, or viewer.

1 The viewer 266 is generally equipped with a high resolution viewing area 602,
2 digital logic (including a key 605, security 606, and a microprocessor 621), video
3 graphics control and memory 607, power supply circuitry 602 (not shown), an optional
4 battery 603 and an optional RF transceiver 604. In a two unit arrangement, the library
5 unit 262 contains the connector function to the video distribution system 208, connector
6 function to a public telephone communications system, and memory 600 (which may be
7 removable and portable 600'). More specifically, the library unit 262 would include data
8 stripping functions 617, digital logic 609, memory storage 600, power circuitry 610,
9 optional telephone connections 611 (including cellular or PCN 611'), optional battery (not
10 shown), optional tuner module 613 and an optional RF transceiver 604. The video
11 connector 212 and the public telephone system connection 270, as well as the removable
12 portable memory unit 600 of the library unit 262 may be broken out into separate
13 components. (Figure 6b shows a removable portable hard disk memory 600' with
14 removable cartridges 614.) Finally, the home system 258 may include an attached
15 keyboard 267 or a wireless keyboard 268. Both the attached keyboard 267 and the
16 wireless keyboard 268 may be used to communicate with the viewer 266 (not shown) or
17 the library unit 262.

18 The wireless keyboard 268 may communicate via radio frequency (RF) signaling,
19 for example. Therefore, the home system 258 may have as many as six separate
20 components which communicate with each other. The two, three, four, five or six
21 separate components which make up the home system 258 can communicate with each
22 other in a variety of ways, including hardwired connection 615, RF transceiver 604, and
23 other wireless methods.

24 RF communications are preferred in the home because they allow separate
25 components to be located throughout the home without restriction. The data
26 communicated between the units is preferably secure data. In addition, the library unit
27 262 may provide power to the viewer 266 through the hardwired connection 615.

1 Alternatively, a single unit may perform all of the home system 258 functions.
2 The single unit should use light-weight materials, including a light-weight battery. A
3 single unit eliminates the need to communicate (externally) between units. The single
4 unit is less expensive and eliminates duplicative processing, memory storage and power
5 circuitry.

6 To receive and strip the data from the video signal at the consumer's home, either
7 a cable interface device or cable connector 212 is used. The cable connector device
8 includes a tuner 613, while the cable interface device makes use of existing tuning
9 equipment in the home. In either configuration, data is stripped from the video signal
10 and stored at the subscriber's location in the library unit 262. The phone connector 270,
11 and modem 611 initiate telephone calls and transmit ordering and billing information to
12 the operations center 250 or billing and collection system 278. Alternatively, the phone
13 connector 270 and the modem 611 may be used to provide access to the Internet to order
14 and receive electronic books from an Internet web site. A digital connector 619 is
15 provided to communicate digital information with the set top 601. The library unit 262
16 is the intelligent component of the home system, incorporating the hardware and software
17 necessary to store the text data, generate menus and effect the purchase transactions. In
18 addition to an RF transceiver 604, the library unit 262 also includes the necessary jacks
19 and connections to allow the delivery system 200 to be connected to the viewer 266. As
20 shown in Figure 6b, the library 262 communicates the text data (electronic book) to the
21 viewer 266 in a secure format which requires a key 605 for decryption. The text is
22 generally only decrypted page by page just before viewing.

23 a. The Video Connector

24 Figure 7 shows the flow of the processes performed by the video connector 212.
25 The video connector receives the video signal 608, tunes to the channel containing the
26 text data 612, strips the text data from the video signal 616, and communicates the text
27 data stream to logic components in the library 620.

1 The connection to the video distribution system is preferably a cable connector
2 to a cable television delivery system, as shown in Figure 6b. The cable connector
3 includes a data stripper circuit 617, which accepts video input from either a set top
4 converter, TV or VCR 601, or an optional tuner block 613 that receives the CATV signal
5 through the cable connector 212'. The data stripper circuit 617 strips data out of the
6 video, and outputs a digital bit stream to the digital logic portion 609 of the library unit
7 262. The data is embedded in the video signal either in the vertical blanking interval or
8 the active video portion in an encrypted and compressed format. The data stripper circuit
9 617 can be placed inside the set top converter box 601, TV, or in the library unit. The
10 data stripper circuit 617 outputs the digital bit stream to be used by the library digital
11 logic 609.

12 The video connector 212 may also contain a channel tuner module 613 that can
13 tune to the video channel and provide access to the video that contains the data to be
14 stripped. Using the optional tuner module 613, a set top converter, VCR, or TV tuner is
15 not needed in the home system. The optional tuner module 613 would instead receive
16 the CATV signal directly through the cable connector 212.

17 b. Library

18 An embodiment of the library unit 262 for a two unit home system 258 is shown
19 in both Figure 6b and Figure 8. The embodiment shown includes the following optional
20 parts: the video connector 212, phone connector 270, RF transceiver 604, and battery
21 pack 624 in addition to a removal portable memory 600', microprocessor 628, instruction
22 memory unit 632, digital logic 636, and power unit 640.

23 The library unit 262 contains a digital logic section 609 (not shown in Figure 8)
24 which includes the microprocessor 628, the digital logic 636 and the instruction memory
25 unit 632. The microprocessor 628 is preferably a secure microprocessor such as the Mot
26 SC21 device sold by Motorola. The digital logic section 609 will receive the serial digital
27 bit stream from the data stripper circuit 617 and process the data. Error correction will
28 also be performed by the digital logic section 609 and the data will be checked for proper

1 address. If the address of the data is correct and the library unit 262 is authorized to
2 receive the data, the data will be transferred to the memory storage unit 600, 600'.
3 Authorization to receive the data is provided by the cable headend or another distribution
4 point. An authorization code may be sent in the serial digital bit stream. The digital logic
5 section 609 will send appropriate text and graphical data to the memory storage unit 600,
6 600'. It transfers this data in a compressed and encrypted format and the data remains
7 stored in a compressed and encrypted format.

8 i. Memory Storage Unit

9 The memory storage unit of the library may be a removable portable memory unit
10 600' (as shown in Figures 6a, 6b and 8). A variety of options are available for memory
11 storage: a hard disk drive, a hard disk with removable platters, and a CD ROM or
12 memory stick. Referring to Figure 6b, a hard disk drive unit 600' which contains
13 removable platters may also be used. This would provide virtually unlimited library
14 storage capacity. Data (i.e., electronic book files) may be stored in the memory storage
15 unit in a compressed and encrypted format. As is also shown in Figure 6b, the data may
16 also contain a key or unique ID number that matches the ID or key of the viewer 266.
17 This matching of a unique key or ID number prevents unauthorized transfer of text data
18 from the memory storage unit to an unauthorized viewer. Small memory devices such
19 as smart cards, electronic memory cards or PCMCIA cards (personal computer memory
20 card industry association) or memory sticks may also be used to store the data.

21 ii. Power Circuitry

22 As shown in figures 6b and 8, the library unit 262 may accept power from either
23 AC wall power 610, DC power 640, or optional battery power 624. The power circuitry
24 610, 640 may provide all the voltage necessary from either the battery 624 or AC unit for
25 the various circuitry in the library. The power circuitry 610, 640 may also provide power
26 to the viewer 266 through a single data cable when connected to the viewer. The power
27 circuitry 610, 640 will recharge the battery using AC power when in operation. With the
28 optional battery unit 624 installed, the library unit 262 becomes a portable unit and can

1 still provide power to the viewer 266. In order to extend battery life, power conservation
2 measures may be utilized, such as shutting down the memory system when not in use.
3 When the viewer 266 is being utilized and the library circuitry is not being utilized,
4 virtually all power may be shut down to the library unit 262.

5 iii. Connection to the Public Telephone System

6 The connection to the telephone system may be provided by a modem 611.
7 Various available modems may be used to perform this function. As shown in Figure 6b,
8 cellular phone or PCN phone connections 611' may also be provided. When the home
9 system 258 is first initialized, the modem may be used to transfer the name and credit
10 card information of the consumer to the billing and collection system 278. The telephone
11 connection 270 may be utilized each time an electronic book is purchased by a consumer
12 to complete and record the transaction. The telephone connection 270 may also be used
13 as a means for receiving the electronic books from the operations center 250 or from an
14 Internet web site, by-passing the video distribution system 208. The phone connection
15 270 may be a separate unit as shown in Figure 6b.

16 iv. Library Processing

17 Figure 9 shows an example of some basic processing performed by the library unit
18 262 on the data stream 651 received from the video connector 212 or stripper circuit 617.
19 First the data stream 651 is checked for error correction by block 650. If an error is
20 detected, block 654 de-interleaves the data followed by block 658 running a FEC
21 (Forward Error Correcting) algorithm. The combination of block 650, 654 and 658
22 perform the error correction needed on the data stream. If no error correction is necessary
23 the data proceeds to block 662 where packets are individually checked for packet address.

24 If the address is a unique address, block 666 checks whether the address of the
25 packet matches the library box ID number. The library box ID number is a unique
26 number associated with that library unit 262 which is used to ensure security of the data.
27 Block 670 determines whether an electronic file has already been opened into which the
28 data packet can be saved. If no data file has been opened then block 674 opens a new

1 data file for that packet. If an electronic file has been opened, then the packet is saved
2 in that electronic file on disk, block 678. Next, the process checks to see if this is the last
3 packet for a particular book for a particular textual data block being received 682. If it
4 is the last packet of information, then the electronic file is closed and the directory of
5 available electronic files is updated 686. Following either block 682 or 686, the process
6 returns to receive another data packet from the data stream received from the data stripper
7 block.

8 If the packet address is checked and the address is determined to be a broadcast
9 address, the process determines the type of message that is being sent 690. The message
10 may be an index of book titles, menu (and menu graphics) information, announcements,
11 special offerings, discounts, promotions, previews etc. The message is then stored in
12 appropriate electronic message file 694 and the process is returned to block 650 to receive
13 another data packet and perform another error check.

14 Using the process of Figure 9, the library unit 262 is able to receive, store and
15 update directories related to the textual data and graphical data (that can be used to depict
16 pictures in a given book or to generate menus). Variations of the processes are possible
17 depending on the format of the data and operating system of the library unit 262.

18 Figure 10 shows an example of the processing of information requests from the
19 viewer 266 at the library unit 262. Information requests from the viewer 266 are received
20 either through the cable connecting the viewer 266 to the library unit 262 or through
21 wireless transmissions such as RF. It is possible in some embodiments for subscribers'
22 requests to come from a set top converter box 602 (see Section V).

23 Information requests received from the viewer 266 generally fall into three
24 categories: (1) directory data of electronic books stored in the library unit 262, (2) index
25 of all available electronic books on the system, and (3) requests for a specific electronic
26 book (Block 700). A get directory process 704 answers a request from the viewer 266
27 for a directory of data showing the electronic books stored at the viewer 266. The
28 directory of data is sent to the viewer 266 so that it may be displayed to the subscriber.

1 A get index process 708 handles requests from the viewer 266 for an index of all
2 available electronic books on the home system 258. The library unit 262 will obtain an
3 index of all the available books on the system and transmit that index, process 712, with
4 menu information to the viewer 266. An open file process 716 replies to a request from
5 the viewer 266 for a specific electronic book. The library unit 262 opens an electronic
6 file for the specific electronic book requested by the viewer 266 and preferably transmits
7 the record or transmits the information 720 on a packet-by-packet basis to the viewer 266.
8 This process of transmitting the specific electronic book, record, or packets to the viewer
9 266 continues until the last record or packet has been sent, 724.

10 In addition to the processes shown on Figure 10 in handling a request for a
11 specific electronic book, the library unit 262 also orders and receives specific electronic
12 books from the operations center 250 using the process as described in the open file
13 process 716. Following a request for a specific electronic book which is not stored at the
14 library unit 262, the library unit 262 will proceed to determine the next available time the
15 electronic book will be on the video distribution system 208 and ensure reception and
16 storage of that electronic book (process not shown). In performing this process the
17 library unit 262 will transmit to the viewer 266 information on when it will obtain the text
18 data for the electronic book so that the subscriber may view the electronic book. In
19 addition to timing information, price and other ordering information may also be passed
20 by the library unit 262 to the subscriber.

21 c. The Viewer

22 Figure 11 is a block diagram of the viewer 266 showing its internal components.
23 The viewer 266 of Figure 11 is similar to the viewer 266 depicted in Figure 6b. The
24 viewer 266 is designed to physically resemble a bound book. The viewer 266 is made
25 up of five primary components and six optional components: (1) LCD display 602, (2)
26 digital circuitry (not shown), (3) video graphics controller 607', (4) controls 740, (5) book
27 memory 728, (6) optional power supply circuitry 736, (7) optional battery 603', (8)

1 optional RF transceiver 604, (9) optional cellular or mobile communicator (608), (10)
2 optional keyboards 267 and 268, and (11) a speaker/microphone 608'.

3 (1) A high resolution LCD screen 602, preferably of VGA quality, is used by
4 the viewer 266 to display text and graphic images. The screen is preferably the size of
5 one page of a book. A two page screen or two screens may also be used with the viewer
6 266.

7 (2) Digital circuitry that includes a secure microprocessor 621, instruction
8 memory 732, and digital logic. Data is transferred to the viewer 266 in compressed and
9 encrypted format. The secure microprocessor 621 compares the ID number of the viewer
10 266 with the incoming data stream and only stores the text data if the ID number of the
11 viewer 266 matches that within the incoming data stream. It is preferred that the viewer
12 266 not output text data or other data and that the data is decompressed and decrypted
13 only at the moment of viewing and only for the current page being viewed. These
14 measures are preferred because they provide additional security against unauthorized
15 access to data.

16 (3) A video graphics controller 607' that is capable of assisting and displaying
17 VGA quality text and graphic images is included in the viewer 266. The graphics
18 controller 607' is controlled by the digital circuitry described above. Text may be
19 displayed in multiple font sizes.

20 (4) The viewer 266 of Figure 11 has touch panel controls 740. These unique
21 and novel controls 740 allow the consumer to select stored electronic books and
22 electronic books from catalogues, move a cursor, and turn pages in a book. Typically,
23 preferred controls 740 include forward and reverse page buttons 742, 741, a ball (or
24 trackball) 743 for cursor movement, one or more selection buttons 745, a current book
25 button 747 and a bookmark button 749 (see Figure 14a).

26 The controls 740 should be easy to use and conveniently located. Referring to
27 Figure 14a, the controls for the viewer 266 may be located below the screen 602 at the
28 bottom portion of the viewer 266. The next page turn button 742 is the most used button

1 740 and may be located towards the right edge of the page. The subscriber is likely to use
2 right hand thumb movements to work the controls particularly the page turn buttons 741,
3 742. Therefore, it is preferred that the buttons be arranged in such a manner that the
4 buttons are easily controlled by a subscriber's right thumb. Generally, this can be
5 accommodated either on the lower portion of the viewer 266 (as shown) or along the right
6 hand margin of the viewer 266 (not shown). The current book button 747 and bookmark
7 button 749 are usually the least used of the controls 740. Therefore, in the example
8 shown those buttons 747, 749 are located on the inside portion towards the binder of the
9 viewer 266.

10 Locating the ball 743 or other cursor movement device (such as four pointer
11 arrows -- not shown) in the bottom center of the viewer 266 is both easier for the
12 subscriber to use and easier in manufacturing the viewer 266. The selection buttons for
13 the cursor 745 are preferably located below the middle diameter of the cursor ball 743 on
14 the right and left sides of the ball as shown. If pointer arrows are used for cursor
15 movement, a selection button 745 may be located in the center of the four arrow buttons
16 (not shown). Again, the most used controls should be located where a subscriber's right
17 hand thumb would normally rest.

18 (5) Book memory 728 for at least one electronic book or more of text is included
19 in the viewer 266. The memory 728 stores text and any graphics which represent pictures
20 in a book. The memory 728 can also store menu graphics data. Two different memory
21 728 devices may be used in the viewer 266, one for the instructions for the
22 microprocessor 621 in the digital circuitry and a second type of memory may be used for
23 the book memory 728 (and graphics). Various memory devices available on the market
24 may be used such as, ROM, RAM or a small hard disk. Since an electronic book requires
25 approximately 0.6 megabytes of storage, a small hard disk providing approximately 60
26 MBytes of storage provides memory to store approximately 100 electronic books. The
27 large hard disk drives currently available allow for storage of thousands of electronic
28 books.

1 Text for books may be displayed in various font sizes. To accommodate various
2 fonts for display, a variety of fonts are stored in instruction 732 or book memory 728.
3 Thus larger or smaller fonts may be recalled from memory 621, 728 to create displays
4 desired by the subscriber.

5 (6) Power supply circuitry 736 in the viewer 266 will accept power from
6 either an AC power source or from an optional battery 603', or the library unit 262. The
7 power supply circuitry 736 provides the necessary voltages to accommodate the various
8 systems within the viewer 266.

9 (7) An optional battery 603' is provided in a preferred embodiment. The
10 battery 603' is automatically recharged when AC power is available.

11 (8) An optional RF transceiver 604 which provided two-way data link
12 between the viewer 266 and other components of the home system can also be included
13 in the viewer 266.

14 (9) Also, the viewer 266 may include a cellular transceiver for mobile
15 communications.

16 (10) The optional wired (attached) keyboard 267 and wireless (e.g., RF)
17 keyboard 268 (see Figure 6a) may be used with the viewer 266 to provide
18 communications between the subscriber and the viewer 266.

19 (11) The speaker and microphone 608' allow the viewer 266 to provide audio
20 signals to the subscriber, and allow the subscriber to provide an audio input. The speaker
21 and microphone 608' may be used in conjunction with the cellular transceiver 608 or
22 other telecommunications equipment to provide for reception and transmission of
23 telephony and data.

24 The viewer 266 of Figure 11 has parts available for providing connections to: a
25 library 744, electronic card memory 748, CD ROM units 752, and a portable memory unit
26 756 (such as that shown in Figure 6b 600'). Various electronic memory cards such as
27 PCMCIA can be used with this viewer 266.

1 Security, low power consumption and excellent display technology are desired
2 features of the viewer 266 design. The viewer 266 should be lightweight and portable.
3 The viewer 266 contains a software operating system that allows electronic books to be
4 stored, read and erased and includes the capability to order electronic books and retain
5 them in memory 728 for a predefined period of time determined by the system operator.
6 The software can be configured to allow the electronic book to be read during a period
7 of time (i.e., two weeks) and then automatically erased, read once and erased, or held in
8 memory permanently. Each viewer 266 has a unique key 605. All of the data storage is
9 encrypted with the key 605 for an individual viewer 266 to prevent more than one viewer
10 266 accessing the text file or electronic book file.

11 Figure 12 is a flow diagram of some of the processes executed by the viewer 266.
12 Generally, the viewer 266 receives inputs from the subscriber through touch panel
13 controls 740. Alternately, the viewer 266 receives inputs from a touchscreen display, the
14 attached keyboard 267, or the remote keyboard 268. The subscriber's information
15 requests are then processed through an information request process 800 by the viewer
16 266.

17 If the subscriber requests a menu of available electronic books, a select available
18 book process 804 will select a book menu. An open file process 808 will open the
19 electronic files which list the electronic books that are available (related to the category
20 of topic of the menu) and display the menu with the names of the available electronic
21 books.

22 If the subscriber selects a particular electronic book to read, then a select a book
23 process 812 will process the selection and determine the electronic file that contains the
24 specific electronic book. An open file process 816 will open the file for that specific
25 book and normally access the first page. (If a pointer has already been set in that
26 electronic book's file, the process may default to that page.) A decision process 820 will
27 then determine which page needs to be displayed. The decision process 820 will
28 determine whether a next page, previous page or a book marked page needs to be

1 displayed. If the pointer for the electronic file is not in the correct location then a get
2 previous page process 828 will move the pointer and obtain the previous page of data
3 from the stored file. Otherwise, a get next page process 824 will normally obtain the next
4 page of text from the stored electronic file. A decrypt and decompress process 832 will
5 decrypt and decompress the text data and send the data to the video display. The video
6 display will generally have a video display memory associated with it and the decrypt and
7 decompress process 832 will send the data directly to that video display memory. The
8 circuitry for the display then completes the process of displaying the page of text.

9 If the subscriber, through the controls 740, requests (from the information request
10 process 800) that the power be turned off, then a process, 836, of turning the power off
11 will be initiated. A save pointer process 840 saves the pointer in memory to the page
12 number in the book that the viewer 266 is currently reading. A close files process 844
13 closes all the electronic files and signals the power circuitry to shut down the power to
14 the various circuits in the viewer 266. The subscriber may also use the controls 740 to
15 access other electronic files using electronic links embedded in a particular electronic file.
16 An electronic link system will be described later in detail.

17 With these examples of basic processes the viewer 266 is able to display book
18 selections and display text from those books.

19 d. Menu System

20 Referring generally to Figure 13, the delivery system 200 may have a menu
21 system 851 for selecting features and electronic books from the delivery system 200. The
22 operating software and memory required for the menu system 851 may be located at the
23 viewer 266 (e.g., the instruction memory 732 and/or book memory 728). However, it
24 may also be located at the library unit 262 (e.g., the instruction memory 632) or the
25 library unit 262 and the viewer 266 can share the software and memory needed to operate
26 the menu system 851. Since the menus are usually displayed on the viewer 266 and it is
27 preferred that the viewer 266 be capable of operating in the absence of the library unit

1 262, the basic software and memory to create the menus is more conveniently located at
2 the viewer 266.

3 The menu system 851 allows sequencing between menus and provides menu
4 graphics for graphical displays such as on the LCD display 602 of the viewer 266. In a
5 system which uses a set top converter these menus may also be displayed on a television
6 screen. In the simplest embodiment, the menus provide basic text information from
7 which the subscriber makes choices. In more sophisticated embodiments, the menus
8 provide visual displays with graphics and icons to assist the subscriber.

9 Figure 13 depicts a menu system 851 with sequencing. The primary menus in the
10 system are an introductory menu 850, a main menu 854 and various submenus 858. In
11 the embodiment shown, there are three levels of submenus 858. In certain instances one
12 or two submenus 858 is sufficient to easily direct the subscriber to the selection or
13 information requested. However, there are features in which three or more submenus 858
14 make the user interface more friendly for the subscriber. Each level of submenus 858
15 may consist of multiple possible menus for display. The particular menu displayed
16 depends on the selection by the subscriber on the previous shown menu. An example of
17 this tree sequence of one to many menus are the help submenus 887, 888. Depending
18 upon the specific help requested, a different level two help menu is displayed to the
19 subscriber.

20 An example of an introductory menu 850 is shown on Figure 14a. Generally the
21 introductory menu 850 introduces the viewer 266 to the system and provides initial
22 guidance, announcements and instruction. The introductory menu 850 is followed by a
23 main menu 854, an example of which is shown in Figure 14b. The main menu provides
24 the viewer 266 with the basic selection or features available in the system. Figure 14b
25 is an example of a main menu 854 offering many additional features and submenus 858
26 to the subscriber. For example, Figure 14b shows that the viewer 266 is able to choose
27 by a point and click method, many options including: (1) free previews, (2) books you
28 can order, (3) books in your library, (4) your current book, (5) help, (6) on-line services

1 and (6) other system features. Following a selection on the main menu 854, a
2 corresponding submenu 858 is shown.

3 Figure 13 shows thirteen available primary or first level submenus. They are (1)
4 account set up 862, (2) free previews 866, (3) book suggestion entries 855, (4) books in
5 your library 872, (5) books you can order 878, (6) your current book 884, (7) help 887,
6 (8) available features 890, (9) messages 893, (10) account information 896, (11) outgoing
7 message submenu 898, (12) show links 970, and (13) create links 980. Figure 14c is an
8 example of a first level submenu for electronic books in your library 872. This "Book In
9 Your Library" example submenu 872 shows six available electronic books by title and
10 author and provides the subscriber with the ability to check a different shelf of books 874
11 or return to the main menu 854. Figures 14d and 14e show example submenus 858 for
12 electronic books that may be ordered using the "Books You Can Order" submenu 878.

13 Figure 14f is an example of an order selection and confirmation menu 880', which
14 provides a "soft keyboard" 975 for the subscriber to use in placing an electronic book
15 order and which confirms the subscriber's order. In this particular example, the
16 subscriber is required to enter a PIN number to complete the subscriber's order. The
17 "soft keyboard" 975 could be configured as a full alpha-numeric keyboard, and may be
18 used by the subscriber to add additional information related to a book order. An alpha-
19 numeric or similar password may be used to ensure the subscriber is an authorized
20 subscriber. In an embodiment, the subscriber confirms an order with a PIN or password
21 and then receives a final confirmation screen. The final confirmation screen is primarily
22 text and may state: Your book order is now being processed via CABLE.

23 Your book will be delivered overnight and your VISA account will be charged
24 \$2.95.

25 Your book will be available for reading at 6:00AM EST tomorrow. Make sure
26 that:

- 27 1. your Library Unit and Cable Connection Unit are plugged in with
28 aerials up tonight; and

1 2. you tune your cable converter to THE BOOK Channel. The TV set
2 does not have to remain on.
3 or similar language.

4 Examples of the "Account Set Up Menu" 862 and further submenus 858 related
5 to account set up (which provide instructions and account input 864) are shown in
6 Figures 14g and Figure 14h. These submenus 858 allow initialization of an account at
7 the operations center 250 and orders to be charged to credit cards. The submenus 858
8 include the ability to enter data related to your desired PIN number or password, credit
9 cards, phone numbers, etc. It is preferred that the account set up be performed using the
10 telephone system. A confirmation menu verifies that the account has been properly set
11 up with the desired PIN or password and credit card.

12 Free previews for books 866 are also provided by submenus (868, 870).
13 Examples of the free preview menus are shown in Figure 14i and Figure 14j. Figure 14i
14 shows a menu depicting various electronic books for which previews are available for
15 viewing. Following an electronic book selection, a screen submenu showing an excerpt
16 of the selected electronic book cover's description is provided along with an excerpt from
17 a critic's review of the selected electronic book. In a preferred embodiment, this preview
18 screen for a particular electronic book also allows the subscriber to select a submenu
19 which provides information about the author. The book preview submenu may also
20 include a still video picture or graphics portraying a book cover or a scene from the
21 electronic book. An example of such a still video picture or graphics is shown in Figure
22 14j which depicts a preview screen 870 about the author. The video may also be
23 provided according to MPEG standards as a short moving video clip. Such a clip could
24 be an interview with the author, for example. The author's preview screen 870 shows a
25 picture of the author, provides a short biography, and may allow the subscriber to order
26 the author's books. The price for ordering the authors various electronic books may also
27 be shown on the menu. Alternatively, the previews may be provided through an
28 electronic link system, disclosed in the related application identified above.

1 In addition to free previews, in more sophisticated embodiments, the delivery
2 system 200 provides the subscriber with an electronic book suggestion feature (see 855).
3 This is accomplished using the menu system 851 and the processor with associated
4 memory located at the viewer 266, library unit 262 or at the distribution point (1020 or
5 250). When necessary, information for the program suggestion feature is sent in the text
6 data of the composite or video signal to the home system 258. With this feature, books
7 or authors are suggested to a subscriber based upon historical data of the subscriber's
8 previous orders, demographics or mood of the subscriber, other indicators, and/or by text
9 word searches.

10 In a book suggestion embodiment, text word searches of preview information
11 (such as book cover descriptions, critics reviews and biographies about the author) and/or
12 text of books or other titles are performed by the library unit 262 using databases stored
13 in the library memory 600. Personalized book or author suggestions are made to the
14 subscriber by obtaining information from the subscriber indicative of general subscriber
15 interests. Subscriber entries are solicited from the subscriber preferably using the
16 electronic book suggestion entries submenu 855. The system uses these subscriber
17 entries either directly or indirectly to search for books or authors to suggest to the
18 subscriber.

19 Generally, the book suggestion methods may be categorized into two categories,
20 either responsive methods (which respond to a series of subscriber menu entries), or
21 intelligent methods (which analyze data to suggest an electronic book). Using a
22 responsive or intelligent method, the delivery system 200 determines a list of suggested
23 titles or authors and creates a second or third level submenu 856, 857 to suggest the titles
24 for subscriber selection.

25 Responsive methods of suggesting titles include, for example, the use of mood
26 questions, searching for authors, and keyword searching. Using the instruction memory
27 732 and menu generation hardware (e.g., 607) of the viewer 266, a series of mood
28 questions can be presented on menus to determine a subscribers interest at a particular

1 time. For this methodology, the operations center's 250 processor 404 and instruction
2 memory 416 assign each title mood indicators (and subindicators) from a group such as
3 light, serious, violent, short, long, dull, exciting, complex, easy-read, young theme, old
4 theme, adventure, romance, drama, fiction, science-fiction, etc. These indicators are sent
5 to the home system 258 with the text data and are stored in library memory 600. Based
6 upon the subscriber entries, the processor 404 associates a set of indicators with the
7 subscriber's request and a set of electronic books with matching indicators are located for
8 suggesting to the subscriber.

9 Responsive searches for authors or keywords (a search word provided by the
10 subscriber) are generally performed by the library processor 628 and instruction memory
11 632 on data stored in the library memory 600. For example, a keyword given by the
12 subscriber may be searched for a match in library memory 600 storing the book reviews,
13 critics and previews databases. Thus, if a subscriber provided an entry of the word
14 "submarine" on an appropriate submenu, the title "Hunt For Red October" may be located
15 by the library processor 628 using instruction from a routine in the instruction memory
16 632.

17 Intelligent methods of suggesting programs include analyzing personal profile
18 data on the subscriber and/or historical data about the subscriber such as past books
19 ordered by the subscriber (or buy data). This method is preferred in a book on demand
20 system and can be performed at the distribution point or operations center 250 by the on-
21 site processor 404 using subscriber databases stored in memory 428. The home system
22 258 receives the text data including program suggestion information from the distribution
23 point or operations center 250 and generates the program suggestion submenus 855, 856,
24 857 using the same text data receiving 212 and viewer menu generation hardware (e.g.,
25 607, 621) described above. Software routines and algorithms stored in instruction
26 memories (e.g. 632, 732) are used to analyze historical data and book ordered data to
27 determine a line of books to suggest to the subscriber.

1 The algorithms for this powerful feature of suggesting books or authors to
2 subscribers are disclosed in great detail in U.S. Patent No. 5,559,549, entitled
3 REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON
4 A TELEVISION PROGRAM DELIVERY SYSTEM, issued September 24, 1996, and
5 are incorporated herein by reference.

6 Referring to Figure 13, submenus 858 are shown on the "Books In Your Library"
7 submenu 872 and are preferably broken into shelf numbers with submenus for each shelf
8 874, 876. The submenus 858 for the "Books You Can Order" submenu 878 is similarly
9 broken out into submenus by shelves 880, 882. These shelves may each be a category or
10 genre of books. Electronic books may be grouped into categories such as best sellers,
11 novels, fiction, romance, etc. See Figure 14d.

12 Referring to Figure 13, the submenu 858 for "Your Current Book" 884 allows a
13 subscriber to select a current book 884 and then determine what page to view. This
14 selection is confirmed with a level two submenu 885. The help submenu 887 provides
15 the subscriber with additional help screens 888. The submenus 858 for available features
16 890 are preferably broken out into a sequence of separate submenus for each feature 891,
17 892.

18 Referring to Figure 13, messages can also be sent with the delivery system 200.
19 A level one message screen provides the subscriber with the ability to select from various
20 messages the subscriber has pending 893. Each message is then shown on a separate
21 submenu screen 894, 895. The message may contain text and graphics.

22 Referring to Figure 13, account information is shown on a level one submenu 896
23 and then follow-on submenus 858 show the recent orders and your account balance 897.
24 There is also a level one submenu for outgoing messages 898 which has a follow-on
25 submenu used as an input screen 899.

26 In addition to the specific features and submenus described in Figure 13 and
27 Figure 14a through Figure 14j, many other variations and features are possible. When

1 a book is finally selected for viewing the title page 886 will appear on the screen followed
2 by a page of text.

3 III. The Billing And Collection System

4 The billing and collection system 278 (shown in Figures 2 and 3) utilizes the
5 latest technology in electronic transaction and telephone switching to track orders,
6 authorize deliveries, bill consumers, and credit publishers automatically. The telephone
7 calls initiated by the phone connector 270 are received by the billing and collection
8 system 278 which responds immediately without human intervention by placing the order
9 and charging the consumers credit card account. Data is compiled periodically and
10 publishers 282 are credited for sales of their books or other text. The billing and
11 collection system 278 may also connect with subscribers through two-way cable
12 connections, cellular, or other communication means.

13 It is preferred that the billing and collection system 278 communicate with the
14 operations center 250 to track changes in available books and to provide statistical data
15 to the operations center 250.

16 IV. Public Library, School, and Bookstore System

17 The electronic book system can be modified to be used at public libraries, schools
18 and bookstores. Figure 15 shows one possible arrangement of components for a public
19 library, school or bookstore location. The main unit at a public library, school or
20 bookstore is the file server 900. The file server 900 is a large electronic memory unit that
21 can store thousands of electronic books. Various electronic storage means may be used
22 in the file servers, such as hard disks, read-write CD ROMs and read-only CD ROMs.

23 The system comprises five components; the file server 900, a converter or video
24 connector 904, a controller 908, a viewer 912, and a catalog printer 916. The software
25 for controlling the system is primarily located in the controller 908. The converter or
26 video connector 904 is similar to those described above. In this configuration the
27 controller unit 908 monitors the data being transferred to the file server 900 by the
28 converter 904. The controller 908 is preferably provided with a viewing screen and

1 several control buttons. When it is necessary to have a larger screen to perform more
2 sophisticated controlling of the system a viewer 266 may be connected to the controller
3 908 and the viewer screen and controls 740 may be used.

4 The controller 908 is only able to download books to public viewers 912 which
5 are authorized to receive books from the particular file server 900. For security reasons
6 it is not desirable that the public viewer 912 have access to more than one file server 900.
7 In this way, security can be maintained over the text data for books. It is preferred that
8 the public viewer 912 be limited to receiving one or two electronic books at a time from
9 the controller 908. When the subscriber of the public viewer 912 needs a new or
10 additional electronic book, the subscriber returns the viewer 912 to the school or public
11 library where the subscriber receives a new electronic book from the controller 908.

12 In order to track the electronic books that are available on the file server 900, the
13 titles of the available books may be printed on a catalog printer 916. The catalog printer
14 916 is connected to the library controller 908 and the titles of the electronic books are
15 downloaded to the catalog printer 916. None of the coded text for any of the electronic
16 books can be printed using the controller 908 and catalog printer 916 of this system. In
17 order to maintain security over the data, none of the electronic book data is allowed to be
18 downloaded to the printer 916. Once a complete printout of available electronic book
19 titles, magazines, or other textual material is complete, a hard copy of the catalog 920 can
20 be maintained at the file server 900.

21 The system shown may also be used at bookstores. The bookstores can rent the
22 public viewer 912 to customers with the text for one or two electronic books loaded onto
23 the public viewer 912. The public viewer 912 may be provided with an automatic
24 timeout sequence. The timeout sequence would erase the textual data for the books after
25 a certain period of time, for example, two weeks. It is expected that after a period of time
26 (perhaps within two weeks) the renter would return the public viewer 912 to the
27 bookstore and receive additional electronic books for viewing. Using this arrangement,
28 it is also possible for the bookstore to (permanently) sell a viewer 912 to a regular

1 customer. The customer then returns to the bookstore from time to time to receive textual
2 data for an electronic book which the customer can then store permanently on the
3 customer's own viewer 912. Various other configurations are possible for bookstores,
4 schools and public libraries using the file server 900 and public viewer 912 described.

5 V. Use of a Set Top Converter

6 Existing set top converters such as those made by Scientific Atlanta or General
7 Instruments are presently unequipped to handle the delivery system 200 of the present
8 invention. Although set top converters may be built which include the library functions,
9 hardware modifications are necessary in order to use the delivery system 200 with
10 existing set top converter technology.

11 Figures 16a and 16b are examples of hardware modifications or upgrades. A port
12 is used to attach hardware upgrades described below to a set top terminal. Two examples
13 of upgrades to set top converters 601 to assist in receiving and selecting electronic books
14 are shown. A menu generation card upgrade (Figure 16a) and an information download
15 unit (Figure 16b). Each of these upgrades may be connected to the set top terminal unit
16 through an upgrade port. A four wire cable, ribbon cable, IEEE 1394 firewire interface,
17 USB interface, or the like may be used to connect the upgrade to the set top converter
18 601.

19 A card addition 950 to a set top converter 601 is depicted in Figure 16a. The card
20 950 shown provides the additional functionality needed to utilize the book selection
21 system with existing set top converter 601 technology. The card 950 may be configured
22 to slip inside the frame of a set top terminal and become part of the set top terminal, an
23 advanced set top terminal. The primary functions the card 950 adds to the set top
24 converter 601 are the interpreting of data signals, generating of menus, sequencing of
25 menus, and, ultimately, the ability of the subscriber to select an electronic book using
26 either the television or a viewer 266. The card 950 also provides a method for a remote
27 location, such as the cable headend, to receive information on electronic books ordered.

1 The electronic books ordered information and control commands may be passed from the
2 cable headend to the card 950 using telephone lines.

3 The primary components of the card 950 are a PC chip CPU 952, a VGA graphic
4 controller 954, a video combiner 956, logic circuitry 958, NTSC encoder 960, a receiver
5 962, demodulator (not shown), and a dialer 611'. The card 950 operates by receiving the
6 data text signal from the cable headend through the coaxial cable. The logic circuitry 958
7 of the card 950 receives data 964, infrared commands 966, and synchronization signals
8 (not shown) from the set top converter 601. Menu selections made by the viewer 266 on
9 the remote control are received by the set top converter's 601 IR equipment and passed
10 through to the card 950. The card 950 interprets the IR signal and determines the
11 electronic book (or menu) the subscriber has selected. The card 950 modifies the IR
12 command to send the information to the set top converter 601. The modified IR
13 command contains the channel information needed by the set top converter 601. Using
14 the phone line 968 and dialer 611', the card 950 is able to transmit electronic books
15 ordered information to the cable headend. It is also possible to receive the electronic
16 books over the telephone lines and by-pass the video distribution system. In this
17 embodiment, the telephone system may be used for example, to provide access to an
18 Internet web site to order and receive electronic books.

19 These commands are passed through the interface linking the set top terminal's
20 microprocessor with the microprocessor of the hardware upgrades. In this way,
21 subscriber inputs, entered through the set top terminal keypad or remote control, can be
22 transferred to any of the hardware upgrades for processing and responses generated
23 therein can then be sent back to the set top terminal for display. In a preferred
24 embodiment the IR commands 966 are transferred from set top terminal 601 to hardware
25 upgrade.

26 Hardware upgrades may include a microprocessor, interactive software,
27 processing circuitry, bubble memory, and a long-term memory device. In addition to

1 these basic components, the hardware upgrade may make use of an additional telephone
2 modem or CD-ROM device.

3 The information download hardware upgrade 1001 (shown in Figure 16b) allows
4 the subscriber to download large volumes of information from the operations center 250
5 or cable headend using the set top converter 601. The hardware upgrade 1001 will enable
6 subscribers to download data, such as electronic books and magazines, to local storage.
7 Primarily, the hardware upgrade 1001 is an additional local storage unit 1003 (e.g., hard
8 disk, floppy, optical disk or magnetic cartridge and may include a microprocessor 1005,
9 instruction memory 1007, and a random access memory 1009, as shown in Figure 16b).
10 Preferably, a small portable viewer 266 is also provided with the upgrade 1001 to enable
11 downloaded text to be read without the use of a TV.

12 The downloadable information may be text or graphics supplied by the operations
13 center 250 or cable headend. With this upgrade, electronic books may be downloaded
14 and read anywhere with the portable viewer 266. Using this upgrade, books may be
15 downloaded and stored in compressed form for later decompression. The electronic
16 books would be decompressed only at the time of viewing. Important text that the public
17 desires immediate access may made available through this system. Text such as the
18 President's speech, a new law, or a recent abortion decision rendered by the Supreme
19 Court may be made immediately available.

20 In one embodiment, electronic book ordering information is stored at each set top
21 terminal until it is polled by the cable headend using a polling request message format.
22 An example of a polling request message format consists of six fields, namely: (1) a
23 leading flag at the beginning of the message, (2) an address field, (3) a subscriber region
24 designation, (4) a set top terminal identifier that includes a polling command/response
25 (or P/F) bit, (5) an information field, and (6) a trailing flag at the end of the message. A
26 similar response frame format for information communicated by the set top terminal to
27 the cable headend in response to the polling request may be used.

1 Figure 17 shows a preferred set top converter that includes a data receiver 617'
2 and a data transmitter 1011. The data transmitter provides upstream data
3 communications capability between the set top converter 601 and the cable headend.
4 Upstream data transmissions are accomplished using the polling system described and,
5 using a data transmitter 1011. Both receiver 617' and transmitter 1011 may be built into
6 the set top converter 601 itself or added through an upgrade module. Regardless of the
7 specific hardware configuration, the set top terminal's data transmission capabilities may
8 be accomplished using the hardware shown in Figure 17.

9 Figure 17 shows RF signals, depicted as being received by a data receiver 617'
10 and tuner 613 working in unison. Both of these devices are interfaced with the
11 microprocessor 1013, which receives inputs 1015, from the subscriber, either through a
12 set top converter's keypad, a remote control unit or the viewer 266. All cable signals
13 intended for reception on the subscriber's TV are accessed by the tuner 613 and
14 subsequently processed by the processing circuitry 1017. This processing circuitry 1017
15 typically includes additional components (not shown) for descrambling, demodulation,
16 volume control and remodulation on a Channel 3 or 4 TV carrier.

17 Data targeted to individual set top converters is received by the data receiver 617'
18 according to each set top converter's specific address or ID. In this way, each addressable
19 set top converter only receives its own data. The data receiver 617' may receive set top
20 converter 601 specific data in the information field of the signal frame described or on
21 a separate data carrier located at a convenient frequency in the incoming spectrum.

22 The received data includes information regarding electronic books and menus
23 available for selection. The subscriber may enter a series of commands 1015 using a
24 keypad or remote control in order to choose an electronic book or menu. Upon receipt
25 of such commands, the microprocessor 1013 instructs the tuner to tune to the proper
26 frequency of the channel carrying data and subsequently instructs the processing circuitry
27 1017 to begin descrambling of this data.

1 Upon selection of the electronic book, the microprocessor 1013 stores any
2 selection information in local memory (not shown) for later data transmission back to the
3 cable headend. The microprocessor 1013 coordinates all CATV signal reception and also
4 interacts with various upstream data transmission components. Typically, the data
5 transmitter 1011 operates in the return frequency band between 5 and 30 MHZ. In an
6 alternative embodiment, the frequency band of 10 to 15 MHZ may be used. Regardless,
7 however, of the frequency band used, the data transmitter 1011 sends information to the
8 cable headend in the information field of the response frame described. Those skilled in
9 the art will recognize that a number of variations and combinations of the above-
10 described set top terminal hardware components may be used to accomplish upstream
11 data transmissions.

12 VI. Books-On-Demand System

13 The electronic book system 200 described may also be configured in a book-on-
14 demand style. Figure 18a shows one example of a configuration for a books-on-demand
15 system. A books-on-demand system requires more powerful two-way communications
16 between the consumer's home, bookstore, school or public library and either the
17 operations center 250 or a distribution site 1020 such as the cable headend. This type of
18 two-way communication can be provided by the hardware shown in Figure 17 and
19 described above.

20 Referring to Figure 18a, in a books-on-demand system, the subscriber selects the
21 electronic book to be download from an available menu of electronic books (see for
22 example Figures 14d and 14e). The data for menus of available books is usually sent to
23 the subscriber location by the distribution site 1020. After the subscriber's menu
24 selection, information about the subscriber selection (or request) is then communicated
25 to either a distribution point 1020 (such as a cable headend or an Internet web site) or the
26 operations center 250. Upon receipt of this request, the needed textual and graphical
27 information for the book is spooled and sent to the subscriber. In this manner, books are

1 only sent when requested by the subscriber and are sent immediately upon demand for
2 the book (or text).

3 In order to support such a books-on-demand system, the text delivery and
4 distribution must be conducted on a strong nodal architected distribution system, such
5 as, a video-on-demand cable or telephone television system, an Internet web site, or
6 through use of individual telephone access on the public telephone system.

7 The books-on-demand system allows for a greater selection of electronic books
8 to the subscriber and limits the amount of communicated book data that is unnecessary
9 or unneeded. It also provides the electronic book to the subscriber in a much timelier
10 fashion.

11 In addition to a stronger distribution system, a books-on-demand system requires
12 a distribution point 1020 to have more sophisticated equipment to access and "spool out"
13 the textual information. This can be accomplished using file server technology 1024 for
14 storing the electronic books and ATM 1028 or telephone-type switching (not shown) to
15 distribute the textual information. The file server 1024 and distribution technology that
16 can be used in configuring such a books-on-demand system is described in U.S. Patent
17 No. 5,262,875 and U.S. Patent 5,218,695, cited above.

18 Figure 18a shows an embodiment for a books-on-demand system that utilizes file
19 server technology. In addition to electronic books, the embodiment of Figure 18a will
20 support distribution of nearly any digital data. Electronic books or textual files are
21 received from publishers 282 and other sources through local feeds 1032, ATM 1028, or
22 by satellite dish 1036. The data is then stored in memory 1040 at the file server 1024.
23 The distribution point 1020 may be a cable headend that receives requests from
24 subscribers and delivers text to subscribers over a two-way communication system (such
25 as a video-on-demand system (VOD) 1044). Alternately, an Internet web site may serve
26 as the distribution point 1020.

27 The library unit 262 can be connected to either a basic premium-type service cable
28 system 1048, a near video-on-demand type cable system (or pay-per-view (PPV) 1052)

1 or a video-on-demand cable system 1044. In connecting with either of these three
2 systems the library unit 262 may access the cable directly or may access the system
3 through a set top terminal 601', 601", or 601'''.

4 Using the two-way video-on-demand system 1044, a subscriber is able to request
5 a specific electronic book title and receive that text immediately following its request.
6 To accomplish this, the distribution point 1020 transmits a list of available electronic
7 books through the cable delivery system to the library unit 262. The library unit 262
8 displays the list of available electronic books on a menu or similar format. As described
9 earlier, it is preferred that the library unit 262 use menus which list categories of available
10 electronic books to form its request from the distribution point 1020. After selecting an
11 electronic book, the library unit 262 sends a request signal on the two-way
12 communication system 1044 back to the distribution point 1020. This request signal can
13 be handled in two ways. The library unit 262 either initiates the request or the
14 distribution point 1020 polls the various libraries on the two-way system 1044. Upon
15 receiving the request for the electronic book title, the text associated with that book title
16 is transmitted to the library unit 262 using the two-way cable system 1044.

17 Figure 18b is an expanded view of a preferred operations center 250 that supports
18 a regional or national books-on-demand system. In fact, the operations center 250 shown
19 supports distribution of nearly any digital data. The operations center 250 supports
20 multiple feeds to receive digital information by tape 1060, 1060', ATM 1028, or satellite
21 1036. The information is processed through an input MUX 1064 and a small file server
22 1068 before reaching the master file server 1072. Digital data such as electronic books
23 received from publishers 282 is then stored on the master file server 1072. It is preferred
24 that the digital data is stored compressed in a standard format such as MPEG2.

25 A system controller 1076 provides control over the regional or national books-on-
26 demand system. Electronic books may be packaged into groups to provide feeds to
27 various cable headends. In addition, scheduling and marketing research are conducted
28 at the operations center 250. In order to handle the scheduling and market research,

1 electronic book buy data is received at the operations center 250 through a multiplexer
2 1082. Electronic book buy information can be provided by the operation center 250 to
3 the billing and collection system 278.

4 The operations center 250 is also equipped to insert messages or advertisements
5 into the file server. These messages or advertisements will eventually be received by the
6 subscribers.

7 The master file server 1072 uses an output multiplexer 1080 and ATM 1028 as
8 well as satellite connections to distribute digital data. In a preferred embodiment, cable
9 headends receive text data on electronic books from the master file server 1080 through
10 the output multiplexer 1028 and an ATM system 1028. After receiving the electronic
11 book data, the cable headends store the books in a local file server 1024. Figure 18a's
12 distribution point 1020 is an example of a cable headend which may receive data from
13 the operations center 250 of Figure 18b through an ATM hookup 1088 or satellite
14 hookup.

15 VII. Restricted Access Features for Electronic Books

16 An electronic book may include various features for restricting access to text or
17 other information contained within it. As discussed below, those features include
18 restricting information in electronic books by user and content. Other features include
19 restricting how a user may access pages of an electronic book based, for example, on
20 page order, content, or time of viewing.

21 Figure 19 is a diagram of a main menu 1100 for restricted access features for
22 electronic books. Main menu 1100 may be displayed on the viewer 266 for permitting
23 a user to select various options relating to restricting access to information in electronic
24 books. Main menu 1100 has a number of sections for permitting the user to select the
25 options by selecting an appropriate section. The term section refers to a definable portion
26 of the screen, and the act of selecting a section may involve, for example, positioning the
27 cursor or a pointer over the section using trackball 743 and depressing selection buttons
28 745 to "click on" the section; other cursor-control devices, including peripheral devices,

1 may be used to select a section either by positioning the cursor or entering a particular
2 command. The sections in main menu 1100, and other described screens, may
3 alternatively have different shapes and may be displayed in a different configuration than
4 that shown. In addition, the screens may have more or fewer sections depending upon,
5 for example, desired functions or displayed information. Also, main menu 1100 and the
6 other described screens may be generated for display on the viewer 266, or retrieved from
7 memory for display, by library processor 628 operating under control of software
8 modules residing within the instruction memory unit 632 or by viewer processor 621
9 operating under control of software modules residing within the instruction memory 732,
10 or by hardware modules, or a combination of hardware and software modules.

11 A view book section 1102 permits a user to select an option to view one of the
12 electronic books stored within the viewer 266 or library 262. An enter book ratings
13 section 1104 permits a user to select an option to enter ratings for the stored electronic
14 books in order to control access to the electronic books. A rating or book rating is any
15 type of information used to control or restrict access to content of an electronic book.
16 Also, ratings may include a range of ratings, and the range of ratings may have associated
17 support levels indicating multiple levels of access such as those provided by the
18 following standard film ratings: G; PG; PG-13; R; and NC-17. An access levels and
19 viewer mode section 1106 permits a user to select an option to enter access levels for
20 users in order to control the users' access to the stored electronic books. This option also
21 permits a particular user to set the operating mode of the viewer 266. Access levels or
22 user access levels are any type of information used to restrict or control particular users'
23 access to content of electronic books. An operating or viewer mode is a particular way
24 in which a viewer restricts or controls access to content of electronic books. It may, for
25 example, restrict access by user access levels, book ratings, a combination of access
26 levels and book ratings, or according to another methodology.

27 Sections 1108, 1110, and 1112 permit a user to select various options for how a
28 particular electronic book may be viewed. A page-based book view section 1108 permits

1 a user to select a page-based book view option, which refers to a feature requiring that
2 pages of an electronic book be viewed in a particular order. A content-based book view
3 section 1110 permits a user to select a content-based book view option, which refers to
4 a feature requiring that portions of a particular page of an electronic book be selected in
5 a particular order before viewing a next page in the electronic book. A time-based book
6 view section 1112 permits a user to select a time-based book view option, which refers
7 to a feature requiring that a page of an electronic book be viewed for a particular amount
8 of time before viewing a next page in the electronic book.

9 Figure 20 is a flow chart of a main menu process 1120 for processing a user's
10 selection of various sections in main menu 1100. Main menu process 1120 may be
11 implemented within the viewer 266, the library 262, or a combination; for example, it
12 may be implemented by software modules residing within the instruction memory unit
13 632 for execution by the library processor 628 or within the instruction memory 732 for
14 execution by the viewer processor 621, or by hardware modules, or a combination of
15 hardware and software modules. In process 1120, a display main menu process 1122
16 displays a main menu 1100 on the viewer 266. A select option process 1124 waits for
17 a user to select one of the sections within a main menu 1100. Upon a user selecting a
18 section in order to choose an option, an option process 1126 selects an appropriate routine
19 based upon the user's selected option. If the user selected the view book section 1102,
20 a view book process 1128 executes a view book routine 1130. If the user selected the
21 book ratings section 1104, a book ratings process 1132 executes a book ratings routine
22 1134. If the user selected access levels and viewer mode section 1106, an access levels
23 and viewer mode process 1136 executes an access levels routine 1138.

24 If the user selected the page-based book view section 1108, a display page-based
25 book view process 1140 executes a page-based book view routine 1142. If the user
26 selected the content-based book view section 1110, a display content-based book view
27 process executes a content-based book view routine 1146. If the user selected the time-

1 based book view section 1112, a display time-based book view process 1148 executes a
2 time-based book view routine 1150.

3 After executing the appropriate routine based upon the user's selection, a decision
4 process 1152 determines if the user has selected another section in the main menu 1100.
5 If so, the option process 1126 is repeated to process the next selected option.

6 Figure 21 is a flow chart of view book routine 1130. The view book routine 1130
7 may comprise software modules stored in a memory, such as the instruction memory 732
8 of the viewer 266 (see Figure 11). The processor 621 then executes the view book
9 routine 1130. The view book routine 1130 includes a viewer mode routine (or module)
10 1162 to determine the operating mode of the viewer 266. The viewer 266 may operate
11 in a number of different modes, as set by a particular user or determined by default. For
12 example, a user level mode module 1164 permits access based upon a particular access
13 level assigned to each user and ratings assigned to the stored electronic books. A book
14 rating mode module 1165 permits access based solely upon the ratings assigned to the
15 stored electronic books. Alternatively, a user may operate the viewer 266 in neither the
16 user level or book rating modes, shown as an unlimited access mode module 1163, which
17 effectively disables the restricted access features. Other modes or default modes are
18 possible for use with restricted access features. The processor 621, using the viewer
19 mode module 1162 determines if the viewer 266 is operating in the user level mode 1164,
20 the book rating mode 1165, the unlimited access mode 1163, or another mode. If
21 operating in the user level mode 1164, a display name screen module 1166 displays a
22 screen requesting a user's name or other identifier. Figure 22 illustrates an example of
23 a name screen 1210 for display on the viewer 266 and including a name section 1212 for
24 the user to enter a name or other identifier.

25 The processor 621 uses a name process module 1168 to receive the user's entered
26 name or identifier. An access module 1170 determines the user's permitted access, which
27 it may accomplish by retrieving from a database an access level assigned to the user. The
28 database, stored for example in the instruction memory unit 632 or within the instruction

memory 732, may include a table cross-referencing user names or identifiers with access levels. Table 1 illustrates an example of access levels one (1) through n and books rates 1, m, and n.

Table 1		
user	access	
identifier	level	meaning
user1	1	access to all electronic books
user2	2	access to no electronic books
user3	3@48	
		access to electronic books rated 1-m
...		
userN	N	access to electronic books rated m-n

A display module 1172 displays a listing of the stored electronic books or a subset of them that are available to the users based on their entered user identifiers. Figure 23 illustrates a select a book screen 1220 for display on the viewer 266 and including sections 1222, 1224, and 1226 identifying stored electronic books 1, 2 and N, respectively.

Returning to Figure 21, a request module 1174 receives the user's selection of a requested electronic book. The user may choose an electronic book for viewing by positioning the cursor on one of the sections 1222, 1224 and 1226 identifying the desired electronic book in the select a book screen 1220 and selecting a desired section on screen, or by entering a particular command using a keyboard or other peripheral device. The processor, using a rating module 1176 then retrieves the rating information for the selected electronic book and compares the information with the user's permitted access.

The rating information may be stored within a header file for each electronic book. The information contained in the header file may be used to identify and categorize each electronic book for display and for other purposes, such as associating a rating with the electronic book or for searching. As new electronic books are stored on the viewer 266 or library unit 262, this header information may be extracted from the

header file and stored in a database resident on the viewer 266 or library unit 262, such as in memory 600 or 600'. The header information associated with each electronic book typically includes the information shown in Table 2, and can be stored, for example, in records or other database structures.

The header file may contain a rating field for storing ratings or rating information for the corresponding electronic book. The header file may also contain other fields relevant to controlling access to electronic books. The header file may include a restricted version field to identify whether the corresponding electronic book is a restricted or unrestricted version; a page-based book view field to identify information for use in determining the particular order of pages for the page-based book view option; a content-based book view field to identify information for use in determining the particular order of sections for the content-based book view option; and a time-based book view field to identify information for use in determining the particular time of viewing pages for the time-based book view option.

Table 2

Title:	
Authors:	
Primary Author:	
Author 2:	
Author 3:	
Author 4:	
Author 5:	
ISBN #:	
Library of Congress # (LC#)	
Dewey Decimal Classification # (DDC#)	
Publisher:	
Edition Number:	
Date of Publishing:	
Related Categories:	
Category 1	Category 6
Category 2	Category 7
Category 3	Category 8
Category 4	Category 9
Category 5	Category 10
Related Keywords:	
Keyword 1	Keyword 6
Keyword 2	Keyword 7
Keyword 3	Keyword 8

1	Keyword 4	Keyword 9
2	Keyword 5	Keyword 10
3	User Defined Criteria 1:	
4	User Defined Criteria 2:	
5	User Defined Criteria 3:	
6	User Defined Criteria 4:	
7	User Defined Criteria 5:	
8	Book Summary/Description:	
9	User Entered Notes:	
10	Rating:	
11	Restricted Version:	
12	Page-Based Book View:	
13	Content-Based Book View:	
14	Time-Based Book View:	
15		

Using a decision module 1178, the processor 621 determines if the user is permitted access to the selected electronic book. It may make this determination by comparing the retrieved rating for the requested electronic book with the permitted access for the user's access level, as shown for example in Table 1. If no access is permitted, the processor 621 uses a display module 1180 and displays an access denied message. Figure 24 illustrates an access denied screen 1230 for display on the viewer 266 and for displaying an access denied message 1232. Otherwise, if the user is permitted access, the processor 621 uses an open module 1182 to open and display the requested electronic book, and a display module 1184 to display pages of the electronic book as requested by the user.

Figure 25 illustrates a book access screen 1240 displaying a cover page 1242 of a requested electronic book to which access is permitted. The book access screen 1240 also displays a page forward button 1244 and a page backward button 1246 to permit a user to page forward and backward, respectively, in the displayed electronic book by selecting the appropriate button. The processor 621 uses a decision module 1186 to determine if the user has closed the displayed electronic book and, if so, routine 1130 returns to display module 1172 to display the listing of the stored electronic books in the select a book screen 1220. A user may close a displayed electronic book by selecting an

1 cursor on a section identifying the desired electronic book on the select a book screen
2 1220 and selecting the action denied section, or by entering a particular command using
3 a keyboard or other device. The processor 621 then uses an open module 1171 to open
4 and display the requested electronic book, and a display module 1173 to display pages
5 of the electronic book as requested by the user.

6 Figure 25 illustrates a book access screen 1240 displaying a cover page 1242 of
7 a requested electronic book to which access is permitted. The book access screen 1240
8 also displays a page forward button 1244 and a page backward button 1246 to permit a
9 user to page forward and backward, respectively, in the displayed electronic book by
10 selecting the appropriate button. The processor 621 uses a decision module 1186 to
11 determine if the user has closed the displayed electronic book and, if so, routine 1130
12 returns to display module 1175 to display the listing of the stored electronic books in the
13 select a book screen 1220. A user may close a displayed electronic book by selecting an
14 icon displayed on the screen, for example, or by entering, using a keyboard or other
15 device, a particular command.

16 Figure 26 is a flow chart of a book ratings routine 1134. The book ratings routine
17 1134 may be implemented within the viewer 266, the library 262, or a combination; for
18 example, it may be implemented by software modules residing within the instruction
19 memory unit 632 for execution by the library processor 628 or within the instruction
20 memory 732 for execution by the viewer processor 621, or by hardware modules, or a
21 combination of hardware and software modules. In the book ratings routine 1134, the
22 processor 621 uses a name/password module 1252 to display a name and password
23 screen for permitting a particular user to enter a name or other identifier for a user and
24 a corresponding password. The password may include an alphanumeric string or any type
25 of information used to verify a user's identity. The particular user has the ability to enter
26 and change user access levels and book ratings.

27 Figure 27 illustrates a password screen 1270 for display on the viewer 266 and
28 having name and password sections 1272 and 1274, respectively, for permitting the user

1 icon displayed on the screen, for example, or by entering, using a keyboard or other
2 device, a particular command.

3 If the viewer 266 is in the book rating mode 1165, the processor 621, using a
4 display module 1188, displays the listing of electronic books, as illustrated in the select
5 a book screen 1220. Using a request module 1190, the processor 621 receives a user's
6 requested electronic book, and with a rating module 1192, retrieves rating information
7 for the requested electronic book and compares the rating information with the viewer
8 access level. The processor 621 next uses a decision module 1194 to determine if access
9 to the requested electronic book is permitted by determining, for example, if the rating
10 for the requested electronic book is within the range of ratings for which access is
11 permitted for the particular viewer mode. If not, using a display module 1196, the
12 processor 621 may display an access denied message, as illustrated in the access denied
13 screen 1230. Otherwise, if access is permitted, the processor 621 uses an open module
14 1198 to open and display the requested electronic book, and a display process 1200 to
15 display pages of the electronic book as requested by the user, as illustrated in the book
16 access screen 1240. Using a decision module 1202, the processor 621 determines if the
17 user closes the displayed electronic book. If so, the view book routine 1130 returns to a
18 display module 1188 to display the listing of electronic books on the select a book screen
19 1220. The access levels may be assigned, for example, locally by a particular user or by
20 a supplier or distributor upon sale of an electronic book or providing a subscription to
21 one.

22 If the viewer 266 is in the unlimited access mode 1163, the processor 621 uses a
23 display module 1167 to display a listing of the stored electronic books or a sub-set of
24 stored electronic books that are available to the user based on the entered user identifier.
25 Figure 23 illustrates the select a book screen 1220 for display on the viewer 266 and
26 includes name sections identifying stored electronic books. Returning to Figure 21, the
27 processor 621 uses a request module 1169 to receive the user's selection of a requested
28 electronic book. The user may choose an electronic book for viewing by positioning the

1 to enter a name or other identifier and a password. Using a receive module 1254, the
2 processor 621 receives the user's entered name or other identifier and the user's
3 corresponding password. The processor 621 then uses a compare module 1256 to
4 compare the user's entered password with stored access information relating to rating of
5 the stored electronic books. The processor 622 uses a decision module 1258 to determine
6 if the user is permitted to enter book ratings by, for example, determining if the user's
7 name and password matches the stored access information. If not, using a display module
8 1268, the processor 621 displays an access denied message, as illustrated in Figure 24.

9 If the user is permitted access, the processor 621, using display module 1260,
10 displays a book ratings menu. Figure 28 illustrates a book ratings screen 1280 for display
11 on the viewer 266 that permits a user to enter ratings for stored electronic books.

12 The book ratings screen 1280 displays book sections 1282, 1284 and 1286 that
13 list electronic books 1-N. associated with each of the book sections is one of a rating
14 section 1288, 1290, and 1292. In addition, optional page restrictions sections 1294-1294"
15 may be used to restrict access to specific pages in an electronic book.

16 Returning to Figure 26, the processor 621 uses a receive module 1262 to receive
17 the user's entered rating information for the stored electronic books and implements the
18 rating information. The viewer 266 or library unit 262 may store the rating information
19 in a database structure, such as a table, for later access and retrieval. The rating
20 information may relate to a content of a corresponding electronic book by, for example,
21 indicating restriction of particular content, a particular type of content, a particular
22 portion of the content, or another type of restriction. The processor 621 then uses a
23 receive standard ratings module 1263 to optionally receive and implement standard
24 ratings, the implementation of which depends upon the particular standard; the standard
25 ratings may be entered by a user or may be predetermined by, for example, a publisher
26 or an operations center.

27 Using a decision module 1264 the processor 621 determines if the user closes the
28 book ratings screen 1280. If not, the book ratings routine 1134 may continue to receive

1 rating information. If the user did close the book ratings screen 1280, a return module
2 1266 is used to return to the main menu and display the main menu screen 1100. The
3 phrase close a screen or close screen refers to removing from display information
4 displayed on a screen of the viewer, and a user may close a screen by selecting an icon
5 displayed on the screen, for example, or by entering via a keyboard or other device a
6 particular command.

7 Figure 29 is a flow chart of implement ratings module 1262, including examples
8 of various ways in which the user may restrict access to the stored electronic books. In
9 the implement ratings module 1262, the processor 621 uses a receive module 1302 to
10 receive the user's identification of an electronic book to rate, which may be accomplished
11 by determining which section the user selected in the book ratings screen 1280 or by
12 determining in which corresponding section a user entered a rating in screen 1280. Using
13 a display ratings module 1304, the processor 621 may display rating options, if desired
14 by a user, and rating options may be implemented by using rating numbers or characters
15 to determine the type of rating. Alternatively, the processor 621 may present another
16 screen with rating options or present such options within separate sections of the book
17 ratings screen 1280. Next, the processor 621 uses a receive module 1306 to receive and
18 process the user's requested type of rating. If the user requested restriction of specific
19 content, as determined using the specific content module 1308, a receive content module
20 1310 is used to display a text screen for displaying pages of an electronic book to a user
21 and for permitting a user to identify information to restrict. The receive content module
22 1310 is also used to receive an identification of content to restrict. A text screen,
23 examples of which are provided in Figures 30a-30f, is a screen displaying a page of an
24 electronic book, the page having information possibly including text, graphics, images,
25 video, or other information capable of visual display. A receive rating module 1312 is
26 used to receive a rating for the restricted content, and a save module 1314 is used to save
27 the entered rating in the header file for the electronic book and restricts the identified
28 content.

1 If the user requested restriction of specific pages, as determined by the processor
2 621 using page restriction module 1316, a receive module 1318 is used to receive
3 identification of pages to restrict, as entered in, for example, in section 1294 of the book
4 ratings screen 1280. A receive rating module 1320 is used to receive a rating for the
5 restricted pages, and a save module 1322 is used to save the rating in the header file for
6 the electronic book and restricts the identified pages.

7 If the user requested restriction of images, as determined during execution of an
8 images module 1324, a receive module 1326 is used to receive a rating for the restricted
9 images, and a save module 1328 is used to save the rating in the header file for the
10 electronic book and restricts the images.

11 If the user requested restriction of the entire content of an electronic book, as
12 determined by the processor 621 using an entire book module 1330, a receive module
13 1332 is used to receive a rating for the restriction, and a save module 1334 is used to save
14 the entered rating in the header file for the electronic book.

15 Table 3 provides an example of rating options and particular ratings, if the rating
16 options are determined by characters or numbers entered in the ratings sections 1288,
17 1290, and 1292, shown in Figure 28. In Table 3, a user would enter a number, for
18 example, as the particular ratings m, n, o, and p. Alternatively, default ratings may be
19 used, as determined for example of different characters or symbols identifying rating
20 options and as further illustrated in Table 3. The viewer 266 may store the entered type
21 of ratings and particular ratings for each electronic book in the header file for each
22 electronic book or in a database table or another type of structure in the instruction
23 memory unit 632 or within the instruction memory 732 to cross-reference the ratings with
24 the electronic books. Ratings may also be based upon standard ratings such as those used
25 in conjunction with the device known as the v-chip, or any type of ratings pre-assigned
26 to the electronic books by, for example, a publisher.

Table 3

rating	meaning
C-m	restrict by content, rating m applied to restricted content
P-n	restrict pages entered in section 1294, rating n applied to restricted pages
I-o	restrict images, rating o applied to the images
B-p	restrict entire content of the book, rating p applied to the book
...	
C-d	restrict by content, default rating applied to restricted content
P-d	restrict pages entered in section 1294, default rating applied to restricted pages
I-d	restrict images, default rating applied to the images
B-d	restrict entire content of the book, default rating applied to the book

Returning to Figure 29, upon completion of restricting access to a particular electronic book, a decision process module 1336 is used to determine if the user has selected another electronic book to rate. If so, the implement ratings module 1262 returns to the receive module 1302 for the processor 621 to perform the processes for restricting and rating the next selected electronic book.

Figures 30a-30f are diagrams of screens for display on the viewer 266 to illustrate in conjunction with implement ratings module 1262 different ways in which a particular user may restrict access to electronic books. Figure 30a is a diagram of a page text screen 1340, which the viewer 266 may display upon a user requesting restriction of specific content. A restrict section 1341 permits a user to restrict selected content, and selection of page turn sections 1343 and 1345 permit a user to page backward and forward, respectively, in the displayed electronic book by selecting the appropriate section. Figure 30b is a diagram of page text screen 1340 with selected text 1342 to be restricted. Upon a user selecting restrict section 1341, the viewer 266 restricts access to the selected text. Figure 30c is a diagram of page text screen 1340 with restricted text section 1344, illustrating removal of the restricted text when viewed by a user who does not have an access level permitting viewing of the restricted text.

Figure 30d is a diagram of a page text and graphics screen 1346 illustrating an image 1348 within a displayed page of an electronic book. A user may restrict the image

1 by selecting the image, as indicated in Figure 30e illustrating image 1350 having a
2 different shaded background to indicate its selection. Upon selecting restrict section
3 1341, the viewer 266 restricts access to the image, and Figure 30f illustrates removal of
4 the image to display a restricted portion 1352 when viewed by a user who does not have
5 an access level permitting viewing of the restricted image.

6 For restriction of particular content, as opposed to an entire book, such as the
7 restriction by specific content (module 1308), page (module 1316), or images (module
8 1324), in one embodiment the viewer 266 restricts the particular content by saving
9 another version of the restricted electronic book with the restricted portions deleted.
10 Therefore, the viewer 266 may store two versions of the same electronic book for
11 restricting access. A first version is the original version, such as that received from a
12 publisher, and includes all content. A second version has all restricted content deleted,
13 such as described with respect to Figures 30a-30d. The header file for each electronic
14 book may use the restricted version field to identify whether the corresponding book is
15 the first (unrestricted) or second (restricted) version, and the restricted version field may
16 also, if desired or necessary, cross-reference the two versions.

17 Figure 31 is a flow chart of an access levels routine 1138. The access levels
18 routine 1138 may be implemented within the viewer 266, the library 262, or a
19 combination; for example, the access levels routine 1138 may be implemented by
20 software modules residing within the instruction memory unit 632 for execution by the
21 library processor 628 or within the instruction memory 732 for execution by the viewer
22 processor 621, or by hardware modules, or a combination of hardware and software
23 modules. In the access levels routine 1138, a display name/password module 1362 is
24 used to display the password screen 1270 permitting a user to enter a name or other
25 identifier and a corresponding password. A receive module 1364 is used to receive the
26 user's entered name or other identifier and entered password. An electronic book viewer,
27 such as the viewer 266, may contain identification of a default user and password,
28 allowing for initial set-up of additional users and their associated access levels by

1 entering the default information using the password screen 1270 and the receive module
2 1364. The default user and password information may be pre-assigned and subsequently
3 provided to a particular user. A compare module 1366 is used to compare the password
4 with stored access information related to assigning access levels to users. A decision
5 module 1368 is used to determine if the particular user is permitted to enter access levels
6 for other users, typically determined by whether the password matches the stored access
7 information. If not, a display module 1370 is used to displays an access denied message,
8 as illustrated in the access denied screen 1230.

9 Otherwise, if the user is permitted access, a display module 1372 is used to
10 display a user access levels/viewer mode screen. Figure 32 illustrates an access
11 levels/viewer mode screen 1400 for display on the viewer 266. The screen 1400 includes
12 an access levels section 1401 permitting the user to enter access levels for other users.
13 The screen 1400 includes name sections 1402, 1404, and 1406 identifying users and, if
14 necessary, permitting entry of information identifying a potential user. Corresponding
15 access levels sections 1408, 1410, and 1412 permit the user to enter access levels for,
16 respectively, users identified by sections 1402, 1404, and 1406. A viewer mode section
17 1403 permits the user to enter a mode for the viewer 266. By selecting user access level
18 section 1414, the user may set the viewer 266 in a mode to restrict access by both user
19 access levels and book ratings. By selecting viewer access level section 1416, the user
20 may restrict access based solely on the book ratings and may enter a particular level in
21 section 1418 to control the level of restriction.

22 Table 4 provides an example of electronic books that a user may access based
23 upon a particular viewer access level entered in section 1418 while in the viewer mode.
24 The viewer mode restricts access to the stored electronic books based upon a rating for
25 each electronic book. A user may enter the parameters r, s, t, and u, or they may be
26 predetermined or established, for example, by a publisher.

Table 4

viewer	electronic books
access level	that may be accessed
1	no electronic books
2	all electronic books
3	only electronic books rated 1-s
...	
r	only electronic books rated t-u

Returning to Figure 31, a receive identification module 1374 is used to receive identifications of users, if necessary, in screen 1400. A receive access levels module 1376 is used to receive access levels entered in, for example, access levels sections 1408, 1410, and 1412. An associate access levels module 1378 is used to associate the entered access levels with the corresponding users and saves such information in a database structure, such as shown in Table 1, for later access and retrieval. A decision module 1380 is used to determine if a viewer mode has been entered in viewer mode section 1403. If not, a default module 1382 is used to set a default mode. A default mode may be predetermined and stored in the viewer 266, or determined and entered by a user. Otherwise, a decision module 1384 is used to determine if the user has entered a viewer mode based upon access levels by selecting user access levels section 1414. If not, a receive module 1386 is used to receive a viewer access level in section 1418, and a save module 1390 is used to save the entered level. A save view mode module 1388 is used to save the viewer mode, in this example either a mode based upon user access levels and book ratings (user access level mode) or based solely upon book ratings (viewer access level mode), or neither of those modes.

A decision module 1392 is used to determine if the user closes screen 1400. If not, the routine 1138 may continue to receive access levels and viewer modes. If the user does close screen 1400, a return module 1394 is used to return to the main menu to display main menu screen 1100.

Figure 33 is a flow chart of page-based book view routine 1142. The page-based book view routine 1142 may be implemented within the viewer 266, the library 262, or

1 a combination; for example, it may be implemented by software modules residing within
2 the instruction memory unit 632 for execution by the library processor 628 or within the
3 instruction memory 732 for execution by the viewer processor 621, or by hardware
4 modules, or a combination of hardware and software modules. In the page-based book
5 view routine 1142, a display module 1422 is used to display an electronic book. Figure
6 34 illustrates a text screen 1425 for display on the viewer 266 for the page-based book
7 view routine 1142. The text screen 1425 displays a page of an electronic book, and it
8 includes a next page section 1427 for selection by a user to select the next page of the
9 displayed electronic book.

10 A request module 1424 is used to receive a user's request for a next page, such as
11 by the user selecting next page section 1427. Alternatively, a user may be required to
12 perform a predefined action such as taking an interactive quiz, prior to being allowed to
13 move to the next page. A decision module 1426 is used to determine if an end of the
14 electronic book is displayed. If so, a return module 1430 is used to return to the main
15 menu to display main menu screen 1100. If the end of the electronic book is not
16 displayed, a display module 1428 is used to display only the next page of a particular
17 order of pages of the electronic book. The viewer 266 may store a particular order for the
18 pages, such as a sequential order, and therefore require that the user view the pages in
19 sequential order. Other orders of pages may similarly be saved. In addition, the
20 particular order may be changed by a user to re-order the pages for a subsequent page-
21 based book view, and different stored electronic books may have different associated
22 page orders for viewing them in the page-based book view mode. The particular order
23 may be stored in the page-based book view field in the header file for each electronic
24 book, or it may be stored elsewhere and referenced by information in the page-based
25 book view field.

26 Figure 35 is a flow chart of content-based book view routine 1146. The content-
27 based book view routine 1146 may be implemented within the viewer 266, the library
28 262, or a combination; for example, it may be implemented by software modules residing

1 within the instruction memory unit 632 for execution by the library processor 628 or
2 within the instruction memory 732 for execution by the viewer processor 621, or by
3 hardware modules, or a combination of hardware and software modules. In content-
4 based book view routine 1146, a display module 1442 is used to display a page of an
5 electronic book having particular sections. Figure 36 illustrates a content restriction
6 screen 1460 for display on the viewer 266 and having sections 1462, 1464, 1466, 1468,
7 1470, and 1472. The content-based book view routine 1196 restricts access to the
8 electronic book displayed in screen 1460 by displaying the next or another page only
9 when the user selects the sections in a particular order, in this example, in numerical
10 order. Other types of restriction are possible for teaching or other purposes. For
11 example, an electronic book used for teaching mathematics could include a page or pages
12 with example problems of increasing difficulty. Associated with each problem could be
13 a model answer. The user's access to the problems may be restricted, using the routine
14 1146, such that the user is provided access to a subsequent problem only after first
15 successfully answering a prior problem.

16 The viewer 266 may store a table or other database structure cross-referencing
17 each page of an electronic book with a selection order for the sections on each page. The
18 header file for each electronic book may store that information in the content-based book
19 view field, or the content-based book view field may include a reference to the
20 information stored elsewhere. The viewer 266 can retrieve that information in order to
21 compare the user's selection with the stored selection to determine whether to display the
22 next page. Table 5 provides an example of an order of selection for an electronic book
23 displayed on the content restrictions screen 1460 and possibly having other pages. As
24 shown in Table 5, each page may have its own particular selection order in which the
25 displayed sections must be selected to view the next page, and each page may also
26 instruct the user to select the displayed sections in a particular order, for example,
27 sequential, reverse sequential, only the odd numbered sections, or only the even
28 numbered sections. In addition, the listing of the pages in the table may identify the order

in which the pages are to be displayed; alternatively, the viewer 266 may permit the user to view any other page after selecting the sections on a displayed page in the particular order.

Table 5

<u>page</u>	<u>selection order for sections</u>
1	1, 2, 3, 4, 5, 6
2	6, 5, 4, 3, 2, 1
3	1, 3, 5
4	2, 4, 6
...	
m	m1, m2, ... mn

The processor 621 uses a receive process 1444 receives the user's selection of the sections in the displayed page of the electronic book. A decision module 1446 is used to determine if the selection satisfies particular criteria relating to the restricted access. If not, a message module 1448 may be used to display a request for the user to reselect the portions. If the selection does satisfy the criteria, a decision module 1450 is used to determine if the end of the electronic book is displayed. If not, a retrieve module 1452 may be used to retrieve the next page of the particular order of pages and returns to display module 1442 to display that page. The next displayed page may also have sections that must be selected in a particular order to again advance to the next page. If the end of the book is displayed, a return module 1454 may be used to return to the main menu to display screen 1100.

Figure 37 is a flow chart of a time-based book view routine 1150. The time-based book view routine 1150 may be implemented within the viewer 266, the library 262, or a combination; for example, it may be implemented by software modules residing within the instruction memory unit 632 for execution by the library processor 628 or within the instruction memory 732 for execution by the viewer processor 621, or by hardware modules, or a combination of hardware and software modules. This routine requires that the user view each page of a displayed electronic book for a particular time period before

1 the viewer 266 will display the next page. In the time-based book view routine 1150, a
2 display module 1482 may be used to display a page of an electronic book, for example, as
3 shown in text screen 1425. A request module 1484 may be used to receive a requested
4 next page from a user. In response, a decision module 1490 may be used to determine
5 if the end of the book is displayed and, if so, a return module 1492 may be used to return
6 to the main menu to display screen 1100.

7 If the end of the electronic book is not displayed, a decision module 1488 is used
8 to determine if a particular amount of time has elapsed since displaying the current page.
9 The viewer 266 or library unit 262 may include an internal timer, such as a timer
10 provided by the viewer processor 621 or the library processor 628, triggered by a page
11 selection in order to determine if the particular amount of time has elapsed. The
12 particular amount of time may be predetermined or entered by a particular user, and it
13 may be stored in the time-based book view field of the header file for the corresponding
14 book or referenced by information in the time-based book view field. In addition, each
15 page may include the same amount of particular time for viewing or varying amounts of
16 time.

17 Table 6 is an example of a table providing viewing times for pages of a particular
18 electronic book. Upon display of a particular page by the viewer 266, it may retrieve the
19 corresponding viewing time for that page from the appropriate table or other database
20 structure and also trigger a timer, or obtain a time stamp or time information from a
21 running timer. The viewing time information may be stored in the time-based book view
22 field for the corresponding electronic book, or it may be stored elsewhere and referenced
23 by information in the time-based book view field. In addition, the listing of pages in the
24 table may identify the order in which the pages are displayed.

25 When another page is requested, the viewer 266 may obtain another time stamp
26 or time information from the timer and compare it with the previous time stamp or time
27 information to determine an amount of elapsed time since the current page was first
28 displayed. If a sufficient amount of time has elapsed, a display module 1486 may be used

1 to display the next page of a particular order of the pages, such as a sequential order.
 2 Otherwise, if a sufficient amount of time has not elapsed, routine 1150 continues
 3 displaying the current page.

4	<u>Table 6</u>	
5	<u>page</u>	<u>viewing time</u>
6	1	2 minutes
7	2	1.75 minutes
8	3	1.5 minutes
9	...	
10	m	n minutes
11		

12 The time-based book view routine 1150 may be incorporated into the viewer
 13 software to control access to specific book content. For example, if an electronic book
 14 includes a page bearing an advertisement, the routine 1150 could prevent that page from
 15 being turned until a sufficient time has elapsed to ensure the user has at least had an
 16 opportunity to view the advertisement. In another alternative use, the routine 1150 could
 17 be used in a school text book to require pages to be turned at a rate set by a teacher, or
 18 programmed into the electronic book. In these alternatives, a warning may be provided
 19 that an allowed time for viewing has elapsed, prior to a page being turned by the
 20 processor 621.

21 While this invention has been described in conjunction with the embodiments
 22 described above, it is evident that many alterations, modifications and variations will be
 23 apparent to those skilled in the art. Accordingly, embodiments of the invention as set
 24 forth above are intended to be only illustrative. Various changes may be made without
 25 departing from the scope of the invention as defined in the following claims and their
 26 equivalents.